

# HORTICULTURAL ABSTRACTS

Vol. XXI

June 1951

No. 2

Initialled abstracts and reviews, not by Bureau staff, are by R. V. Harris, M. M. Macneill, H. B. S. Montgomery, S. C. Pearce, P. W. Talboys and H. M. Tydeman of the East Malling Research Station, H. W. Abbiss of the Gulval Experimental Station, H. W. Miles of Wye College, G. St. C. Feilden, C. W. S. Hartley and F. G. Ordish.

## INDEX OF CONTENTS.

	Nos.		Nos.
MISCELLANEOUS	Abstr. 86. Noted 23	1245-1331w	
General	.. .. .	1245-1249	
Statistical design	.. .. .	1250-1252	
Meteorology and climatic effects	.. .. .	1253-1254	
Biochemistry	.. .. .	1255-1259	
Physiology	.. .. .	1260-1278	
Water relations	.. .. .	1279-1283	
Growth substances	.. .. .	1284-1294	
Colchicine and other polyploidizing agents	.. .. .	1295	
Radioactive materials	.. .. .	1296-1303	
Mineral nutrition	.. .. .	1304-1308	
Water, sand and other nutrient cultures	.. .. .	1309-1317	
Practical devices	.. .. .	1318-1330	
Noted	.. .. .	1331a-1331w	
TREE FRUITS, DECIDUOUS	Abstr. 67. Noted 13	1332-1399m	
General	.. .. .	1332-1341	
Breeding and varieties	.. .. .	1342-1352	
Morphology and growth	.. .. .	1353-1355	
Propagation	.. .. .	1356-1361	
Rootstocks	.. .. .	1362-1371	
Pollination and bees	.. .. .	1372-1380	
Soil management	.. .. .	1381-1383	
Water relations	.. .. .	1384-1385	
Nutrition	.. .. .	1386-1389	
Spraying to thin or retain fruit	.. .. .	1390-1392	
Pruning	.. .. .	1393-1394	
Packing	.. .. .	1395-1396	
Storage	.. .. .	1397-1398	
Noted	.. .. .	1399a-1399m	
SMALL FRUITS, VINES AND NUTS	Abstr. 34. Noted 5	1400-1434e	
Small fruits	.. .. .	1400-1411	
Vines	.. .. .	1412-1425	
Nuts	.. .. .	1426-1433	
Noted	.. .. .	1434a-1434e	
PLANT PROTECTION OF DECIDUOUS FRUITS	Abstr. 105. Noted 25	1435-1540y	
General	.. .. .	1435-1437	
Disturbances of nutrition or of unknown origin	.. .. .	1438-1441	
Climatic factors	.. .. .	1442-1448	
Viruses	.. .. .	1449-1456	
Bacteria	.. .. .	1457-1458	
Fungi	.. .. .	1459-1478	
Nematodes	.. .. .	1479-1480	
Mite and insect pests	.. .. .	1481-1508	
Other pests	.. .. .	1509-1511	
Antibiotics	.. .. .	1512-1513	
Fungicides	.. .. .	1514-1516	
Insecticides	.. .. .	1517-1525	
Spraying methods and apparatus	.. .. .	1526-1530	
Spray residues	.. .. .	1531-1539	
Noted	.. .. .	1540a-1540y	
WEEDS AND WEED CONTROL	Abstr. 62. Noted 26	1541-1603z	
General	.. .. .	1541-1544	
Herbicides	.. .. .	1545-1555	
Apparatus	.. .. .	1556-1558	
Particular weeds	.. .. .	1559-1578	
Weed control in vegetables and potatoes	.. .. .	1579-1593	
Weed control in fruit crops	.. .. .	1594-1596	
Weed control in tropical crops	.. .. .	1597-1600	
Control of undesirable trees and shrubs	.. .. .	1601-1602	
Noted	.. .. .	1603a-1603z	
VEGETABLES, TEMPERATE, TROPICAL AND GLASSHOUSE	Abstr. 121. Noted 18	1604-1725r	
General	.. .. .	1604-1620	
Asparagus	.. .. .	1621-1622	
Brassicas	.. .. .	1623-1629	
Celery	.. .. .	1630-1631	
Cucurbits	.. .. .	1632-1640	
Legumes	.. .. .	1641-1659	
Mushrooms	.. .. .	1660-1670	
Onions and related plants	.. .. .	1671-1679	
Root vegetables	.. .. .	1680-1683	
Salad crops	.. .. .	1684-1685	
Spinach	.. .. .	1686	
Sweet corn	.. .. .	1687-1690	
Sweet potatoes	.. .. .	1691-1693	
Tomatoes and related plants	.. .. .	1694-1719	
Other crops	.. .. .	1720-1724	
Noted	.. .. .	1725a-1725r	
POTATOES	Abstr. 63. Noted 5	1726-1789e	
General	.. .. .	1726-1729	
Breeding and varieties	.. .. .	1730-1736	
Propagation and planting	.. .. .	1737-1739	
Cultivation and nutrition	.. .. .	1740-1752	
Metabolism, growth and composition	.. .. .	1753-1755	
Virus diseases	.. .. .	1756-1765	
Fungous and bacterial diseases	.. .. .	1766-1770	
Nematodes	.. .. .	1771-1773	
Insect pests	.. .. .	1774-1783	
Effects of insecticides on potatoes	.. .. .	1784	
Storage	.. .. .	1785-1788	
Noted	.. .. .	1789a-1789e	
TOBACCO	Abstr. 25. Noted 5	1790-1815e	
General	.. .. .	1790-1792	
Morphology and growth	.. .. .	1793-1795	
Cultivation and nutrition	.. .. .	1796-1797	
Composition	.. .. .	1798-1799	
Diseases	.. .. .	1800-1808	
Insect pests and nematodes	.. .. .	1809-1813	
Harvesting and processing	.. .. .	1814	
Noted	.. .. .	1815a-1815e	



				Nos.					Nos.
MISCELLANEOUS TEMPERATE AND TROPICAL CROPS				Abstr. 54.	Noted 11	1816-1870k	Tung	..	2002
General				..	..	1816	Noted	..	2003a-2003g
Drug plants				..	..	1817-1824	TROPICAL FRUIT AND PLANTATION CROPS		
Essential oils				..	..	1825-1832	Abstr. 107.	Noted 18	2004-2111r
Fibres				..	..	1833-1836	General	..	2004-2011
Gums and resins				..	..	1837-1839	Bananas	..	2012-2015
Herbs and condiments				..	..	1840-1844	Cacao	..	2016-2027
Hops				..	..	1845-1848	Cinchona	..	2028
Insecticidal plants				..	..	1849-1850	Cloves	..	2029-2031
Rubber plants				..	..	1851-1853	Coconuts	..	2032-2036
Tannins				..	..	1854	Coffee	..	2037-2054
Vegetable oils				..	..	1855-1863	Guavas	..	2055
Other crops				..	..	1864-1869	Hard fibres	..	2056
Noted				..	..	1870a-1870k	Mangoes	..	2057
FLORICULTURE				Abstr. 79.	Noted 13	1871-1950m	Oil palms	..	2058-2061
General				..	..	1871-1874	Papaws	..	2062-2063
Annuals and herbaceous plants				..	..	1875-1895	Pineapples	..	2064-2067
Bulbs, tubers, etc.				..	..	1896-1915	Rubber and other laticiferous trees	..	2068-2073
Orchids				..	..	1916-1920	Sugar cane	..	2074-2093
Roses				..	..	1921-1923	Tea	..	2094-2107
Shrubs and trees				..	..	1924-1939	Other crops	..	2108-2110
Lawns				..	..	1940-1949	Noted	..	2111a-2111r
Noted				..	..	1950a-1950m	NOTES ON BOOKS AND REPORTS		
SUB-TROPICAL FRUIT AND PLANTATION CROPS				Abstr. 52.	Noted 7	1951-2003g	Abstr. 81.	Noted 6	2112-2193f
General				..	..	1951	Books	..	2112-2138
Avocadoes				..	..	1952	Reports	..	2139-2188
Citrus				..	..	1953-1997	New periodicals	..	2189-2192
Dates				..	..	1998-2001	Noted	..	2193a-2193f
							Total Abstracts 936. Noted 175.		

N.B.—Numbers sub-divided alphabetically refer to items noted but not abstracted.

## MISCELLANEOUS.

### General.

1245. ZOHARY, M., AND ORSHANSKY, G.  
Structure and ecology of the vegetation in the Dead Sea region of Palestine.  
*Palest. J. Bot. (J.)*, 1949, 4: 177-206, bibl. 31, illus. [received 1951].

An ecologico-vegetational study of the area made during 1942-1945 is summarized. The objects of the investigation were to delimit the vegetation units of the area, to reveal the obvious ecological factors involved in the differentiation of plant communities and to establish a vegetation map. The area is characterized by a desert climate and soils that are for the most part saline. Conventional phytosociological methods proved inadequate for the analytical treatment of the vegetation complexes found in the area. In such regions analysis must often be based on quantitative characteristics, such as dominance and presence of the leading plants belonging to higher life forms, which alone reflect the conditions of the habitat.

1246. JONES, R. J., AND ROGERS, H. T.  
New fertilizers and fertilizer practices.  
*Advances Agron.*, 1949, 1: 39-76, bibl. 150, illus. [received 1951].

A review of recent American work in the development of new and improved forms of fertilizer materials and the use of fertilizers, including the use of anhydrous ammonia, application of fertilizers in irrigation water,

direct application of liquid fertilizers particularly as starter solutions, and plant-nutrient sprays. Reference is made to work with a variety of horticultural crops.

1247. CLARK, F. E.  
Soil microorganisms and plant roots.  
*Advances Agron.*, 1949, 1: 241-88, bibl. 246, being *Pap. la agric. Exp. Stat. J-1612* [received 1951].

A well integrated review of the literature dealing with the effects of the rhizosphere microflora on plant growth and welfare, a complex subject which has been approached from a number of different angles. The effects are divided into (a) those which directly affect the availability of plant nutrients and (b) those which affect plant welfare in other ways, such as by the production of growth substances, decreasing the incidence of root diseases, or the formation of a desirable soil structure. Modification of the root surface microflora by seed or soil inoculations, soil treatment, plant treatment or application of herbicides and insecticides is also discussed, as well as the persistence of the microflora under field conditions.

1248. ASAI, T.  
Die Bedeutung der Mykorrhiza für das Pflanzenleben. (The significance of mycorrhiza in plant biology.)  
*Jap. J. Bot.*, 1943, 12: 359-436, bibl. 46, illus. [received 1950].



The author's mycorrhiza experiments were carried out on a wide range of higher plants grown in a sterile medium with and without the addition of some ordinary garden soil. For most plants the inoculation with garden soil was found to be essential; they did not thrive unless mycorrhiza developed as a result of the inoculation and they were not much benefited by the application of nutrients under sterile conditions. The results of the investigation are summarized in 27 pages of tables comparing the development of plants in a sterile and in an inoculated medium with data on the dry weight of shoot and root, the length of the stem and the number of leaves formed. *Cinnamomum camphora* may serve as an example of the large group of plants which fails to thrive in a strictly sterile medium. Spinach is among the minority of plants that do not require any fungal association for their optimum growth. Both groups of plants were found to grow better in sterilized than in unsterilized soil. The symbiosis between fungus and host and the relationship between mycorrhiza formation and the evolution of higher plants is discussed at some length.

1249. MINISTRY OF AGRICULTURE, LONDON.

**Scheme for a grade assessment and certification service as an assistance to the horticultural industry.**

*Market. Leaflet. Minist. Agric. Lond. 108, 1950, pp. 12.*

The statutory grades for home-grown fruit and vegetables, introduced under the Agricultural Produce (Grading and Marking) Act, 1928, have now been revised by the Ministry of Agriculture in the light of pre-war experience and post-war conditions. The plans for commercial trial of the new "recommended" grades and standard packs are here outlined, and proposals are made for grade assessment and certification for the voluntary use of packers, which it is hoped may be put into effect in 1951.

*Statistical design.*

(See also 2137.)

1250. KOCH, E. J., AND RIGNEY, J. A.

**A method of estimating optimum plot size from experimental data.**

*Agron. J., 1951, 43: 17-21.*

A description is given of Fairfield Smith's approach, depending upon the quantity *b* derived from uniformity data. It is shown that this quantity can also be determined from experimental data if the trial is laid out in lattices or with split plots. For 15 tobacco experiments *b* averaged 0.55 for yield and, in 8 of them, 0.54 for crop value. For 10 cotton experiments the average was 0.49.

S.C.P.

1251. PATTERSON, R. E.

**A method of adjustment for calculating comparable yields in variety tests.**

*Agron. J., 1950, 42: 509-11, bibl. 3.*

This paper describes a method of adjusting varietal yield averages where some "standard" varieties are grown over the whole period of a variety trial, while others are only grown in certain years. In a cotton variety trial 14 "standard" varieties had been grown

for 5 years, while 21 others were grown for 3 or 4 years only. By making use of the principles of the analysis of variance a method was devised of adjusting the yield of each variety in each year it was grown. This left the average yield of the "standard" varieties unaltered, but gave new averages for the other varieties which were directly comparable with each other and with the "standards", since the influence of the variations due to years had been removed. As it was assumed that the 14 "standard" varieties represented the true effect of different years on yield, it was pointed out that the method can be used with greater confidence the more "standards" there are in the trial.—*Tex. agric. Exp. Stat.* C.W.S.H.

1252. BRIEGER, F. G.

**Análise da variação qualitativa em amostras pequenas. (Statistical analysis of qualitative variation in small samples.)**  
[English abstract 2½ pp.]

*An. Esc. sup. Agric. "Luiz de Queiros", Piracicaba, 1948, 5: 35-63, bibl. 4 [received 1950].*

A revision of the methods of analysis used is suggested. In illustration of his thesis, the author cites an example concerned with the measurement of oranges from trees on various sour orange stocks budded with material from a single parent tree.

*Meteorology and climatic effects.*

(See also 2157, 2174, 2192.)

1253. WENT, F. W.

**The response of plants to climate.**

*Science, 1950, 112: 489-94, illus.*

An account is given of the Earhart Plant Research Laboratory at the California Institute of Technology, where air-conditioning can maintain constant temperatures by day and night. The laboratory has only been in operation since July 1949, but already it has thrown considerable light on the temperature requirements and responses of plants. Thus with the tomato it has been found that night temperature controls both the rate of stem growth and fruit set, and that the optimal temperatures for young plants are higher than those for older plants of the same variety. An attempt is made to express, in a three-dimensional diagram, the optimal fruit setting conditions for the San José Canner tomato in terms of the interactions of day temperature, photoperiod and night temperature. Such information could form the basis for selecting areas and seasons in which the tomato might be grown most successfully. These results show, too, that the effect of temperature is complex and cannot be expressed simply as a heat-sum. Certain responses of several other plants are described to illustrate the nature of some of the problems involved.

1254. INGHAM, G.

**The mineral content of air and rain and its importance to agriculture.**

*J. agric. Sci., 1950, 40: 55-61, bibl. 18.*

Evidence is given that the air can supply all the nutritional requirements of plants, independently of the soil or soil bacteria. The fertility of an undisturbed soil lies chiefly in the surface inch or two and is due to



adsorption of plant nutrients from the air by organic and inorganic colloids, such nutrients being carried down to the roots of the growing crop by rain. It will still be necessary, however, to use fertilizers to obtain maximum crops of improved varieties of high-yielding and rapidly growing plants.

### Biochemistry.

(See also 1331c, q, v, 1399m, 1642, 1661, 1725r, 1751, 2063, 2076.)

1255. STRASHEIM, A.  
A few applications of spectrochemical analysis in fruit research.  
*Sci. Bull. Dep. Agric. S. Afr.* **295**, 1949, pp. 12, bibl. 8, illus.

Following a brief account of the theory of, and apparatus used for, spectrochemical analysis, the author gives examples of ways in which it has been used both qualitatively and quantitatively.

1256. NICHOLAS, D. J. D.  
Use of *Aspergillus niger* for determining magnesium, copper, zinc, molybdenum and manganese in soils and plants.  
*Proc. Fert. Soc.* **10**, 1950, 13-40, bibl. 45, illus.

*Aspergillus niger* (Mulder strain) has been used as a test organism for determining Mg, Cu, Zn, Mn and Mo in soils, and the last named in tissue extracts and the ash of plants. Special chemical and ion exchange methods are used for the removal of the micronutrient elements from the mineral macronutrients and dextrose so that basal culture solutions are biologically free from Mg, Cu, Zn, Mn and Mo respectively. The assessment is made by determining dry weight yields of the fungus and intensity of spore cover. The technique is described and data from cultures are tabulated. The bioassay applied to soils has shown: Mg deficiency in the presence of K shortage, a point not shown by visual symptoms or chemical analysis of the plants; Cu deficiency in soils where "summer die back" occurred in fruit trees; zinc deficiency in soils where apple and pear showed "little leaf" effects.

1257. VAN DER PAAUW, F.  
Plant analysis as a means of evaluation of chemical soil tests.  
Reprinted from *Trans. internat. Congr. Soil Sci.*, Amsterdam, 1950, **1**, pp. 4.

This paper chiefly refers to grassland but mentions the determination of the K-number (the amount of K related to humus) of sandy soils by means of the specific weight of potatoes, determined as "weight under water". With the same K-number a high humus content coincides with a low specific weight. A high humus content corresponds at the same level of exchangeable K with a higher availability. The larger sorption complex (humus) contains a greater amount of available K.

1258. MANGAN, J. L.  
A method for the analysis of mixtures of inorganic sulphur compounds.  
*N.Z. J. Sci. Tech. Sect. B*, 1949 (published Oct. 1950), **30**: 323-33, bibl. 6.

A method is described for the separation and estimation, in mixtures, of dithionate, polythionate, sulphate, thiosulphate, sulphite and sulphide in one aliquot of a solution. The method has been applied to plant extracts and has been found satisfactory, although the accuracy of results is of a lower degree than that obtained in pure solutions. [From author's summary.] —D.S.I.R., Palmerston North.

1259. WATSON, J.  
Note on the colorimetric determination of zinc in plant material.  
*N.Z. J. Sci. Tech. Sect. B*, 1949 (published Oct. 1950), **30**: 319-21, bibl. 1.

The method of Cholak, Hubbard and Burkey [*Indust. engng. Chem.*, 1943, **15**: 754] for the colorimetric estimation of zinc in plant material has been tested on samples of apple leaves. The method, with certain minor modifications, has given results which agree closely with determinations made by the polarographic method of zinc estimation. [Author's summary.] —Cawthron Inst., Nelson.

### Physiology.

(See also 1331d, i, k, l, m, r, t, u, 1672, 1673, 1724, 1963, 1972, 1973, 2012.)

1260. GREGORY, F. G., AND SAMANTARAI, B.  
Factors concerned in the rooting responses of isolated leaves.  
*J. exp. Bot.*, 1950, **1**: 159-93, bibl. 17, illus.

It is suggested that the establishment of the isolated leaf with its own root system presents useful possibilities in physiological research. The rooting of leaves of *Phaseolus vulgaris* and *Hedera helix* was studied.  $\beta$ -indolylbutyric acid (IBA) was used with *Phaseolus*, and  $\alpha$ -naphthylacetic acid (NAA) with *Hedera*. Very young leaves were killed and the most responsive leaves were those second from the apex with *Phaseolus* and ninth with *Hedera*. The optimal concentrations were 2.5 p.p.m. for IBA and 100 p.p.m. for NAA; these substances entered the tissues through the xylem. Starvation by darkness or separation of the lamina from the petiole reduced rooting. The roots arose in the rays between the vascular bundles in *Phaseolus*, and opposite the phloem outside the vascular bundles in *Hedera*. Sugar was of great importance in the commencement of rooting. It was found that the application of the growth substance leads to rapid starch hydrolysis and translocation of nitrogen to the petiole where protein synthesis takes place. *Hedera* leaves were still alive after 2 years. C.W.S.H.

1261. BROWN, R., AND BROADBENT, D.  
The development of cells in the growing zones of the root.  
*J. exp. Bot.*, 1950, **1**: 249-63, bibl. 15.

By making serial sections of known thickness along the roots of peas it was shown that the weight of the cell wall, the protein content and respiration increase during development from the meristematic to the fully extended state. Increases in respiration and protein content occur in two stages, the first large and the second small. Respiration and protein content decrease slightly when extension ceases. C.W.S.H.



## 1262. KOJIMA, H.

On the problem of influence of oxygen surrounding the aerial part of the plant upon the elongation of the root and the cell-division of the root-tip. [Japanese, English summary.]

*Bul. sci. Fak. Terkult. Kyûsû imp. Univ.*, 1939, 8: 315-20, from abstr. in *Jap. J. Bot.*, 1940, 11: (14) [received 1950].

The roots of *Vicia faba* plants were placed in oxygen-free tap water, the aerial parts being in air, oxygen-free air or pure oxygen. There was little difference between the three treatments in the rate of root elongation or the frequency of cell division. The rate of root elongation was only 10% of that of plants with their roots in aerated water, and the frequency of cell division was 2-3% of that of plants with their roots in moist sawdust.

## 1263. LEVINE, M.

The growth of normal plant tissue *in vitro* as affected by chemical carcinogens and plant growth substances. 1. The culture of the carrot tap-root meristem.

*Amer. J. Bot.*, 1950, 37: 445-58, bibl. 26, illus.

Pieces of carrot tap root meristem were grown on synthetic media of mineral salts and organic compounds and developed callus growths. These growths were accelerated by addition of indoleacetic acid (IAA) and developed nodules and pigmented tissue. This treatment also gave rise to hyaline amorphous tissue which, after repeated transfers, differentiated physiologically and morphologically; and when this tissue was transferred to media not containing IAA, plantlets with leaves and independent root systems developed. Some tissue masses produced thallus-like organs. All tissue types were treated with the carcinogens 1,2,5,6-dibenzanthracene (D), 3,4-benzpyrene (B) and 20-methylcholanthrene (M). These substances had various stimulatory effects, and there were indications that the effects of D were greater than those of B or M. Thalloid tissue masses occurred after treatment with carcinogens, but normal plantlet production was resumed when these substances were removed. It is pointed out, therefore, that the properties of animal cells which make malignant transformations possible through the application of carcinogens are obviously lacking in the plant.

C.W.S.H.

## 1264. STERLING, C.

Histogenesis in tobacco stem segments cultured *in vitro*.

*Amer. J. Bot.*, 1950, 37: 464-70, bibl. 14, illus.

For the study described here internodes were used, split into quarters and with epidermis, collenchyma, some cortical parenchyma and some pith parenchyma removed. Four culture media were used: control, added growth substance (indoleacetic acid or naphthaleneacetic acid), added adenine sulphate, added growth substance and adenine sulphate. The resulting tissue development is described in detail. In all treatments callus tissue was formed from the cambium and internal phloem. The growth substances caused root development, but with adenine sulphate added to

growth substances root primordia were only occasionally produced. With adenine sulphate alone bud primordia developed from superficial or sub-peripheral cells. The changes taking place in 2 and 4 weeks are clearly illustrated in a diagram.

C.W.S.H.

## 1265. ASHBY, E., AND WANGERMANN, E.

Studies in the morphogenesis of leaves. V. A note on the origin of differences in cell size among leaves at different levels of insertion on the stem.

*New Phytol.*, 1950, 49: 189-92, bibl. 4.

The factors which cause a difference in cell size between upper and lower leaves in *Ipomoea caerulea* operate (a) early in the phase of cell division, before the leaf reaches an area of 0.04 sq. cm., and also (b) at the point where cell expansion begins, by prolonging (in an upper leaf) the phase of cell division and delaying the onset of cell expansion. [Authors' summary.]

## 1266. HEATH, O. V. S., AND MILTHORPE, F. L.

Studies in stomatal behaviour. V. The role of carbon dioxide in the light response of stomata.

*J. exp. Bot.*, 1950, 1: 227-43, bibl. 14, illus.

Experiments were carried out to find the effect of (1) CO<sub>2</sub> concentrations of 0.00, 0.01, 0.02 and 0.03%, (2) light intensities of 275, 625 and 975 f.c., and (3) rate of air flow of 2, 5 and 12.5 l./hr. on wheat leaf stomata. Reduction of CO<sub>2</sub> concentration to 0.01% caused the stomata to open in all lights and rates of flow except 975 f.c. with 2 l./hr. Increase of light intensity opened the stomata even at 0.00% CO<sub>2</sub>, suggesting an effect of light other than that exerted indirectly through photosynthesis by the mesophyll cells. Increased flow of dry air caused closure through the drying effect.

C.W.S.H.

## 1267. IMAMURA, S.

Untersuchungen über den Mechanismus der Turgorschwankung der Spaltöffnungsschliesszellen. (Studies on the mechanism of turgor fluctuation in stomatal guard cells.)

*Jap. J. Bot.*, 1943, 12: 251-346, bibl. 152, illus. [received 1950].

*Zebrina pendula*, *Commelina communis*, *Rumex acetosa* and *Vicia faba* were used as test plants.

## 1268. GALSTON, A. W.

Phototropism. II.

*Bot. Rev.*, 1950, 16: 361-78, bibl. 60.

This is a review of the work which has been done on the physiology of phototropism since 1939. The author states the previously held conceptions concerning phototropism, and draws attention to recent work which supports or conflicts with these ideas. In particular he draws attention to the part played by pigments, carotinoids and riboflavin-containing compounds, which assist in the perception of blue light by phototropically reactive plant parts. The transport of auxins through the influence of light has not been fully demonstrated. In the presence of pigments, indoleacetic acid plays a part in phototropism owing to its rapid photoinactivation, but the relation of auxin photoinactivation to phototropism is still not clear.

C.W.S.H.



1269. SCHRANK, A. R.

**Inhibition of curvature responses by shunting the inherent electrical field.**

*Plant Physiol.*, 1950, **25**: 583-93, bibl. 7.

Experiments at the University of Texas showed that curvature of isolated *avena coleoptiles* is always inhibited by filling the internal cylinder of the sheath with an electrolyte, and thus support the hypothesis that the existence of an inherent electrical field is an essential requirement for growth responses.

1270. KOSKI, V. M.

**Chlorophyll formation in seedlings of *Zea mays* L.**

*Arch. Biochem.*, 1950, **29**: 339-43, bibl. 2.

It has been shown that it is possible to distinguish between the transformation of dark-formed protochlorophyll into chlorophyll *a* and the formation of chlorophyll *a* from additional precursor formed in the light at 18° C. Thus, it is possible to make studies of the transformation process alone, under these conditions. Convincing evidence has been obtained that protochlorophyll is transformed into chlorophyll *a*. [Author's summary.]—Carnegie Inst., Washington, Stanford, Calif.

1271. DAVIS, E. A.

**Likelihood of photorespiration or light-inhibited respiration in green plants.**

*Science*, 1950, **112**: 113-15, bibl. 10.

Tests are described, involving mutant strains of *Chlorella* which are unable to photosynthesize or evolve oxygen in light, but yet are green, respire and grow when supplied with a suitable carbon source. No photorespiration was observed, and since rates of respiration were similar in light and in darkness it seems certain that light has no direct effect on respiration.

1272. KLEŠNIN, A.

**The effect of the different regions of the spectrum on the development of plants.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, **70**: 891-4, bibl. 8, illus.

In experiments with lettuce, strawberry, cucumber, cabbage, soya bean, *Amaranthus retroflexus*, and other plants, it was found that orange-red radiation was particularly active in promoting development. For plants which in orange-red radiation quickly pass into the reproductive stage (e.g. lettuce), blue rays are more desirable.

1273. MOŠKOV, B. S.

**The significance of the different parts of the spectrum for the physiological study of the growth and development of certain plants.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, **71**: 171-4, illus.

From experiments carried out on lemon seedlings and the oil-producing perilla [*P. nankinensis*], it was concluded that the photoperiodical reaction of plants depends on the wavelength of the radiant energy in relation to the length of daily illumination.

1274. MOŠKOV, B. S.

**The effect of infra-red radiation on the processes taking place in darkness in the short day plant *Perilla nankinensis* (energo-periodism).** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, **71**: 391-4, illus.

In the short day plant *Perilla nankinensis* infra-red radiation checks those normal metabolic processes that proceed during darkness, and so, when applied during the night, cannot be considered as the equivalent of physiological darkness. This is seen in the inhibition of flowering in short day plants submitted to infra-red radiation during the usual hours of darkness. For this reason the author suggests that the term "energo-periodism" should be used to replace "photoperiodism".

1275. ŽDANOVA, L. P.

**The significance of gaseous exchanges in plants during periods of illumination.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, **70**: 715-18, bibl. 10, illus.

Experiments with perilla and rudbeckia are described, from which it is concluded that a change in the normal course of the oxidation-reduction processes towards anaerobic conditions during the dark period of the day (under short day conditions) delays the flowering of short day plants and stimulates flowering in long day plants.

1276. LONA, F.

**La fioritura delle brevidiurne a notte continua. (Flowering of short day plants in continuous darkness.)** [English summary 1 p.]

*Nuovo G. bot. ital.*, 1949, **56**: 479-515, bibl. 58 [received 1951].

Experiments were carried out on the short day plants *Chenopodium amaranticolor* and *Perilla ocymoides* var. *nankinensis*. It was found that the plants behaved photoperiodically in relation to their age. Plants of *C. amaranticolor* grown for 14 weeks under long day illumination formed inflorescence primordia after one 16-hours nictophase. *Perilla* plants grown for 16 weeks in long days were able to form inflorescence primordia after three 12-hours nictophases.

1277. WAYGOOD, E. R., AND CLENDENNING, K. A.

**Carbonic anhydrase in green plants.**

*Canad. J. Res., Sect. C*, 1950, **28**: 673-89, bibl. 20, being [Publ.] N.R.C. 2250.

Carbonic anhydrase was found in leaf extracts prepared from 19 out of 22 land and aquatic plant species examined. The most active preparations were obtained from *Spinacia oleracea* L., *Tetragonia expansa* Thunb., *Tropaeolum majus* L., and *Sambucus canadensis* L. The white zones of variegated *Tradescantia* leaves contain 50% less carbonic anhydrase than their green counterparts. Albino barley leaves contain 75% less carbonic anhydrase than normal barley leaves of the same size and age. The carbonic anhydrase content of green leaves kept in darkness for 4 and 5 days was lowered by 30-50%. Very young leaves contain less enzyme than mature leaves. These results are discussed in relation to the possible role of carbonic anhydrase in photosynthesis. [From authors' abstract.] —National Research Laboratories, Ottawa, and McGill University, Montreal.



1278. DOMAN, N. G.

**Peroxidase in laticiferous plants.** [Russian.]*Doklady Akad. Nauk S.S.S.R.*, 1950, 71:

1081-4, bibl. 8, illus.

The peroxidase activity was investigated in a number of plants, including *Euonymus*, kok-saghyz, onion (scales), geranium (root), fig tree (root), and horseradish (root); it was particularly high in horseradish.

**Water relations.**

(See also 1433, 1703, 1741, 1846, 1946, 2036.)

1279. ANON.

Sobre la presión osmótica en algunos vegetales. (The osmotic pressure of some [xerophytic] plants.)

*Idia*, 1950, 3: 25/27: 13, illus.

A study of the osmotic pressure of the cell sap of a number of plants found growing in the saline soils of Salinas Grandes, Córdoba, Argentina, was undertaken by the Institute of Botany, Buenos Aires. The results are tabulated. Even though the material was studied during the rainy season, the values recorded are high. It is thought that such a study may be of use in the selection of plants suitable for growing in this region.

1280. TOMBESI, L.

Produzione di sostanza organica e disponibilità idrica del suolo. I. (Production of organic substances in relation to available soil moisture. I.) [English summary  $\frac{3}{4}$  p.]

*Ann. Sper. agrar.*, 1950, 4: 697-714, bibl. 1.

The rate of water consumption and the production of organic substances in relation to the availability of water in the soil has been investigated for *Solanum lycopersicum*, *Arachis hypogaea*, *Vitis vinifera*, *Phaseolus vulgaris* and *Brassica oleracea* var. *oleifera*. The maximum (and optimum) water consumption for seeds, stems, leaves, etc. occurs in these plants when the available soil moisture ranges from 60 to 80%.

1281. TOMBESI, L., AND TARANTOLA, M.

La composizione dei semi di alcune specie vegetali in relazione alle disponibilità idriche del suolo. II. (Chemical composition of seeds of some plants in relation to available soil moisture. II.) [English summary  $\frac{1}{2}$  p.]

*Ann. Sper. agrar.*, 1950, 4: 715-24, bibl. 5.

The chemical composition of seeds in relation to available soil moisture has been studied in *Phaseolus vulgaris*, *Brassica campestris* var. *oleifera*, *Arachis hypogaea*, *Linum usitatissimum* and *Vicia faba*. Crude fats and proteins increase remarkably with increased available water. The content of cellulose and the non-nitrogenous extracts increase in the seeds of plants grown in soil with insufficient water.

1282. TOMBESI, L., AND OTHERS.

Attività catalasica ed energia critica su semi provenienti da piante a diverso regime idrico. (Catalase activity and critical energy of seeds coming from plants with diverse water regimes.) [English summary  $\frac{1}{4}$  p.]

*Ann. Sper. agrar.*, 1950, 4: 725-33, bibl. 3.

The catalase content of the seeds of five species studied (including *Vicia faba*) diminished with decreases in soil water.

1283. ABOU RAYA, M. A.

**The rate of water-loss from stripped leaves.***J. exp. Bot.*, 1950, 1: 322-8, bibl. 14.

Stripping off the epidermis of *Sedum* leaves is found to increase the rate of water-loss by amounts of the order of 700%. A high resistance of the pores of the stomatal epidermis to the diffusion of water-vapour from the mesophyll is thus indicated. Stripping one surface of a leaf considerably increases the rate of transpiration from the other (untouched) surface. The explanation of this is under investigation. [Author's summary.]

**Growth substances.**

(See also 1331b, 1390, 1391, 1392, 1546, 1547, 1548, 1550, 1551, 1552, 1553, 1612, 1677, 1700, 1704, 1752, 1820, 1872, 1969, 1970, 2020, 2022, 2065, 2110.)

1284. VELDSTRA, H.

4. Actions synergiques des analogues structuraux. (The synergistic action of structural analogues.)

Reprinted from *Bull. Soc. Chim. biol.*, 1948, 30: 772-92, bibl. 44, illus. [received 1951].

A review of work on the subject, which includes experiments with growth substances, insecticides and materials for breaking dormancy, together with a discussion of the nature of the synergistic action of structural analogues and of the problems that remain to be studied.

1285. LINSE, H.

Zur Wirkungsweise von Wuchs- und Hemmstoffen. I. Wachstumswirkungen von Indol-3-Essigsäure und Eosin sowie pflanzlicher Wuchs- und Hemmstoffe im Gemisch an der *Avena*-Koleoptile. (The mode of action of growth-promoting and growth-inhibiting substances. I. The action of mixtures of indole-3-acetic acid and eosin and of plant growth-promoting and growth-inhibiting substances on *avena* coleoptiles.) [English and French summaries 6 and 8 lines respectively.]

*Biochim. biophys. Acta*, 1951, 6: 384-94, bibl. 15.

Mixtures of growth activators (indole-3-acetic acid and extract of brussels sprouts) and growth inhibitors (eosin and extract of lilac leaves), at various concentrations, were applied in the form of pastes to *avena* coleoptiles. Values were obtained for the longitudinal growth caused by cell elongation. The results appear to justify the attempt, made by Kaindl [see abstract 1286], to explain the growth-promoting and inhibitory action on the basis of competitive adsorption.

1286. KAINDL, K.

Zur Wirkungsweise von Wuchs- und Hemmstoffen. II. Versuch einer trefferstatistischen Deutung der Wirkung von Wuchs- und Hemmstoffen. (The mode of action of growth-promoting and growth-inhibiting substances. II. A statistical interpretation of the action of growth-promoting and growth-inhibiting substances.) [English and French summaries 6 lines each.]

*Biochim. biophys. Acta*, 1951, 6: 395-405.



It is shown that the concentration-activity curves of growth activators and inhibitors, as deduced from a target theory model, can be brought to agree satisfactorily with the experimental results. The essential principles of the action of mixtures of growth activators and inhibitors can also be realized by this model. More experimental and theoretical work will be necessary to show whether the model constructed in this paper has a general applicability. [Author's summary.]

1287. NICKELL, L. G.

**Effect of coconut milk on the growth *in vitro* of plant virus tumor tissue.**

*Bot. Gaz.*, 1950, 112: 225-8, bibl. 15.

Coconut milk has been found to stimulate the growth of various plant materials. When added to the basal medium supporting a good growth of virus tumour tissue from sorrel (*Rumex acetosa*), growth was much stimulated. Autoclaved milk produced more stimulation than sterile-filtered milk. C.W.S.H.

1288. DHILLON, A. S., AND LUCAS, E. H.

**Absorption, translocation, and persistence of 2,4-dichlorophenoxyacetic acid in some plants.**

*Bot. Gaz.*, 1950, 112: 198-207, bibl. 13, illus., being *J. Art. Mich. agric. Exp. Stat.* 1131.

Experiments were designed to determine whether, and how, 2,4-D was translocated through tomato, bean, maize and oat plants. Translocation after absorption had hitherto been largely assumed. The 2,4-D was applied to the roots and the leaves. Translocation from the roots was proved by (1) the effect of exudates from cut stumps on test bean plants, and (2) Freed's test on the sap from the cut surfaces. The exact chemical nature of the substance translocated will, however, require further investigation. Translocation was through the xylem. Absorption by tomatoes was more rapid than by the other plants. Translocation from the leaves was also proved, movement probably taking place through the phloem and xylem. Movement of 2,4-D was multidirectional and the substance persisted in leaves, stems and roots for 26 days. C.W.S.H.

1289. DE ROPP, R. S.

**Some new plant-growth inhibitors.**

*Science*, 1950, 112: 500-1, bibl. 5, illus.

The growth-inhibiting action of 57 compounds has been assessed in the laboratory of the New York Botanical Garden. The most active growth inhibitors belonged to the group of analogues of pteroylglutamic acid, some of these compounds completely suppressing the growth of excised tomato roots and almost completely inhibiting the growth of sunflower tumour tissue. Certain nitrogen mustards, 8-azaguanine (guanazolo), and cortisone also exerted an inhibitory action on the growth of plants and crown-gall tumours. None of the substances tested exerted a specific inhibitory effect on tumour as opposed to healthy tissue.

1290. MOORE, R. H.

**Several effects of maleic hydrazide on plants.**

*Science*, 1950, 112: 52-3, bibl. 2.

The diethanolamine salt of maleic hydrazide at 2,400 and 600 p.p.m. of the active ingredient was sprayed

onto a wide range of plants. Early visible effects on sensitive plants, in some cases at the higher concentration only, were: (1) stunting of many species due to a temporary suspension of stem elongation from terminal buds or the death of terminal buds and adjacent tissues; (2) expansion of lateral buds some time later; (3) a transient intensification of green in the leaves of stunted plants, e.g. in bush bean and sweet corn; (4) a localized accumulation of anthocyanins or other non-green pigments, e.g. sweet corn and violets; (5) narrowing of leaves and distinctive patterns of chlorosis, e.g. bush bean, sweet corn, sunflower and red coleus; (6) interference with water absorption, apparently caused by the death of root tips, e.g. sweet corn and beetroot; (7) the suppression of nodule formation on bush beans; (8) total, temporary, or male sterility, e.g. gladiolus, China aster, violet and sweet corn. Plants that remained apparently unaffected even by 2,400 p.p.m. were carrot, cabbage, bearded iris, lily-of-the-valley, Jonathan apple, Kieffer pear, sweet potato and common plantain (*Plantago major*). Full results are to be published elsewhere.—Dep. Bot., Univ. Neb., Lincoln.

1291. HACKETT, D. P., AND THIMANN, K. V.

**The action of inhibitors on water uptake by potato tissue.**

*Plant Physiol.*, 1950, 25: 648-52, bibl. 10.

A simplified method for the measurement of the aerobic water uptake by discs of storage tissue is described. The water uptake can be inhibited quantitatively by azide, dinitrophenol, arsenite and fluoroacetate, all of which are inhibitors of oxidative enzyme systems and also of growth. Implications of the results with respect to the link between respiration and water absorption are briefly discussed. [Authors' summary.]—Harvard University, Cambridge, Mass.

1292. CHRISTIANSEN, G. S.

**The metabolism of stem tissue during growth and its inhibition. V. Nature and significance of the exudate.**

*Arch. Biochem.*, 1950, 29: 354-68, bibl. 17.

Isolated sections of etiolated pea stems excrete organic material when grown in the presence of indoleacetic acid and iodoacetate. This exudation is characteristic of the combination of auxin and iodoacetate and does not take place in the presence of auxin alone, iodoacetate alone, nor auxin plus other inhibitors (arsenite and fluoride were studied). The mechanism of the exudation is discussed. [From author's summary.]—Harvard Univ.

1293. BARLOW, H. W. B.

**Studies in abscission. I. Factors affecting the inhibition of abscission by synthetic growth-substances.**

*J. exp. Bot.*, 1950, 1: 264-81, bibl. 33.

In experiments with apple pedicels and petioles from which the fruit or blade had been removed, it was shown that abscission bears a direct linear relationship to the concentration of growth substances  $\alpha$ -naphthylacetic acid and 2:4-dichlorophenoxyacetic acid applied. These substances were applied in lanolin emulsion or in agar gel as carriers and were effective up to 100 p.p.m. but only when applied distally to the abscission zone. With pedicels, the longer the distance from point of



application to the abscission zone the less was the delay in abscission. The growth substances must reach the abscission zone within a certain critical period after removal of leaf blade from the petiole. C.W.S.H.

1294. RICE, E. L.

**Effects of various plant growth-regulators on flowering in several crop plants.**

*Bot. Gaz.*, 1950, 112: 207-13, bibl. 18.

Previous experiments have shown that, with the exception of pineapples, the flowering of plants tends to be delayed by the application of growth substances. Tests were carried out on Stringless beans, Little Marvel peas, Pawnee winter wheat, Wintok oats, Early Blood Turnip garden beets, Danvers Half Long carrots and white sweet clover, using sodium 2,4-D, sodium 2,4,5-T and 4 chloro-o-toloxycetic acid at concentrations of 0.1, 1.0 and 10 p.p.m. The time of flowering was not affected by any treatment, except that it was delayed in bean plants sprayed with 10 p.p.m. Na 2,4-D or Na 2,4,5-T. The former substance also caused the plants to be stunted. It is suggested that it would be more logical to use anti-auxins or auxin-inhibitors in attempts to induce flowering. C.W.S.H.

**Colchicine and other polyploidizing agents.**

(See also 1681, 1815d.)

1295. FRAHM-LELIVELD, J. A.

**Experiments with polyploidogenic and other agents in different types of plants under tropical conditions.**

*Ann. bot. Gdms, Buitenzorg*, 1949, 51: 231-67, bibl. 38, illus.

It was considered that polyploidization would be useful in crossing diploid robusta coffee with the tetraploid arabica. Work on coffee with colchicine and other agents was interrupted by the war, but later an extensive range of chemical agents was tested on *Canavalia ensiformis* seedlings and on onion roots. With colchicine, polyploidy was obtained from rather lower concentrations than had been found active elsewhere. A number of wetting and spreading agents were tried with colchicine. Most of them had a toxic effect, but the use of a small quantity of Dispersol VL made colchicine active at a lower concentration. C.W.S.H.

**Radioactive materials.**

(See also 1748, 1749, 1750, 1804, 2148, 2168.)

1296. RUSSELL, R. S., AND MARTIN, R. P.

**Studies with radioactive tracers in plant nutrition. I. Problems in the use of radioactive tracers.**

*J. exp. Bot.*, 1950, 1: 133-40.

In tracer investigations the tracer is assumed to behave in the same way as the normal isotope or "carrier". This assumption required testing and in particular it was desired to determine the behaviour of tracers before discharge of radiation, the effect of the new substances formed, and the effect of the radiation itself. It was concluded that, with the exception of  $H^1$  and  $H^3$ , the behaviour of radioactive isotopes was such that they could be usefully employed, if conditions were carefully controlled and safeguards properly planned. It is pointed out, however, that where chemical methods

are adequate, and where tissues can be easily dissected and separately analysed, the use of radio-autographs offers no special advantages. C.W.S.H.

1297. MARTIN, R. P., AND RUSSELL, R. S.

**Studies with radioactive tracers in plant nutrition. II. The estimation of radioactive tracers.**

*J. exp. Bot.*, 1950, 1: 141-58, bibl. 53.

The assaying of samples containing  $P^{32}$  by an electronic assay method using Geiger Muller counter tubes connected to an electronic scaling unit is described. Laboratory procedure and sources of error are discussed. It is pointed out that, in using tracers, analyses must be completed within the period dictated by the activity of the sample and the half-life of the isotope. In nutritional studies using  $P^{32}$ , 12-16 weeks is often the latest time, after the start of the experiment, for satisfactory analysis. This restricts the scope of tracer experiments, for it is just as important that the statistical requirements should be met in this type of experiment as in any other. Simplification of equipment and increasing its reliability will therefore be of great advantage. C.W.S.H.

1298. BEAL, J. M., AND SCULLY, N. J.

**Chromosomal aberrations in onion roots from plants grown in an atmosphere containing  $C^{14}O_2$ .**

*Bot. Gaz.*, 1950, 112: 232-5, bibl. 6, illus., being *Contr. Hull bot. Lab.* 619.

The effect of the radioactive isotope  $C^{14}$  on the nuclei of onion roots was ascertained by introducing  $C^{14}O_2$  into the atmosphere of an Argonne nutriceulture plant growth chamber. Some of the radioactive isotope was also absorbed through the nutrient solution. Roots of plants so treated showed chromosome and chromatid breaks and fragments in dividing cells, bridging and micronuclei. One leaf showed a chlorophyll-deficient streak. C.W.S.H.

1299. MITCHELL, J. W., AND LINDER, P. J.

**Absorption and translocation of radioactive 2,4-DI by bean plants as affected by co-solvents and surface agents.**

*Science*, 1950, 112: 54-5, bibl. 7.

Radioactive iodine ( $I^{131}$ ) in the form of 2,4-dichloro-5-iodophenoxyacetic acid (2,4-DI $^{131}$ ) and its morpholine salt was used to determine (1) the distribution of the growth substance in bean plants following absorption of the compounds by the leaves and (2) the effect of different adjuvants on the rate of absorption and translocation. In contrast to earlier results with 2-iodo-3-nitrobenzoic acid in which the greatest quantity of growth substance accumulated in the terminal buds, both the acid and morpholine salts of 2,4-DI $^{131}$  accumulated mainly in the first internodes and upper part of the hypocotyls. The use of several adjuvants increased significantly the rate of absorption and translocation of the morpholine salt.—U.S. Dep. Agric., Beltsville, Md.

1300. MITCHELL, J. W., AND LINDER, P. J.

**Absorption of radioactive 2,4-DI as affected by wetting agents.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 21-5, bibl. 7.

We have found (1) that very young as well as fully



expanded leaves of bean may not absorb and translocate the growth regulating chemical, 2,4-DI<sup>131</sup> acid, as readily as leaves that are partially expanded or that have recently become fully expanded, (2) that young but fully expanded leaves may absorb the 2,4-DI<sup>131</sup> at a relatively constant rate provided that favourable conditions prevail, (3) that such adjuvants as Emulphor, Tween 20, and others may increase the rate of absorption of the growth regulator, and (4) that the 2,4-DI<sup>131</sup> acid accumulated in the upper stems of young test plants when the chemical was applied to their leaves. [Authors' summary.]

1301. BOULD, C., NICHOLAS, D. J. D., AND THOMAS, W. D. E.

**Radiation effects in plant nutrition experiments with phosphorus-32.**

*Nature*, 1951, 167: 140-2, bibl. 9.

In these experiments on barley and tomato grown in pots the carrier used was sodium dihydrogen phosphate at two levels equivalent to 200 and 500 lb. superphosphate per acre respectively. Both carrier levels were labelled with activities from 0.5 to 500  $\mu$ C. phosphorus-32 per pot as orthophosphate, corresponding to a range of specific activities of 12-29, 760  $\mu$ C. phosphorus-32 per g. phosphorus-31. In the tomato experiment the only significant result was an increase (at the 1% level) in the soil phosphate uptake in the tops at the 500  $\mu$ C. per pot level. From the data presented, the following, among other, conclusions are drawn by the authors: "Radiation effects on the growth and physiology of barley and tomato do occur at low radioactive dosages, lower than those accepted as 'safe' by some investigators. Thus for certain experiments this must be taken into account by adopting a statistical lay-out with two or three levels of phosphorus-32 and -31. The most striking feature of the experiments as a whole, however, is the smallness of the radiation effects, despite the fact that we have worked at concentrations of phosphorus-32 far greater than would normally be used in 'tracer' work, and at much higher specific activities ( $\mu$ C. phosphorus-32 per g. phosphorus-31) than those adopted by other workers. . . . It would thus appear from our investigations that the overall effects of radiation are slight, and are in no way sufficient to preclude the use of phosphorus-32 in plant nutrition experiments in soil."—Long Ashton Research Station.

1302. BLUME, J. M., HAGEN, C. E., AND MACKIE, R. W.

**Radiation injury to plants grown in nutrient solutions containing P<sup>32</sup>.**

*Soil Sci.*, 1950, 70: 415-26, bibl. 6, illus.

Barley plants were grown in nutrient solutions containing various amounts of P<sup>32</sup>. The lowest level at which damage was produced under the experimental conditions employed corresponds to 5.6 millicuries P<sup>32</sup> per gram of P<sub>2</sub>O<sub>5</sub>.

1303. LEONARD, C. D., AND TOH, S. J.

**Plant studies with radioactive sodium.**

*Agron. J.*, 1950, 42: 469-74, bibl. 9, illus.

In experiments with radish, lettuce, lucerne, beet, oats, celery and tomatoes, in sand and outdoor cylinder cultures, it was found that the absorption of Na<sup>22</sup> was governed by the same factors that determined the uptake of Na. The uptake of Na<sup>22</sup> was affected by the

K and Na levels. Na<sup>22</sup> tended to be concentrated in the conducting tissues of plants and, in the case of tomatoes, in the less mature parts of the plant. There were differences between species in the absorption rate of Na<sup>22</sup>.—N.J. agric. Exp. Stat. C.W.S.H.

*Mineral nutrition.*

1304. HAYWARD, H. E., AND WADLEIGH, C. H.  
**Plant growth on saline and alkali soils.**

*Advances Agron.*, 1949, 1: 1-38, bibl. 124

[received 1951].

A critical review article dealing with the following aspects of the subject: (a) the physiological basis of salt and alkali tolerance, (b) how saline and alkali soils affect plant growth, (c) salt tolerance as related to germination, vegetative growth and maturation of the plant, and (d) specificity in salt tolerance.

1305. LYNDE, J. Q., TURK, L. M., AND COOK, R. L.

**Nutrient deficiencies diagnosed with foliar analyses and plant tissue tests.**

*Agron. J.*, 1950, 42: 402-7, bibl. 40, being

*J. Art. Mich. agric. Exp. Stat.* 1050.

A comparison was made between two methods of detecting nutrient deficiencies in plants. These were foliar analysis, in which the total quantity of nutrients in the leaves is determined, and green tissue tests which determine the approximate quantity of unassimilated inorganic nutrients. The tests were carried out in a greenhouse with maize and beans on five widely different soil types. Each soil was subjected to NP, NK, PK and NPK treatments with an untreated control. Another trial in the greenhouse included applications of CaCO<sub>3</sub> and MnSO<sub>4</sub>, while tests were also made in the field with corn growing on one soil type. The green tissue method was found to be a rapid and reliable method of detecting changes in the nutrient status of plants but, as it is only roughly quantitative, its main uses would appear to be in (1) substantiating the results of the more accurate leaf analyses, and (2) detecting changes in composition throughout the season. C.W.S.H.

1306. BERGER, K. C.

**Boron in soils and crops.**

*Advances Agron.*, 1949, 1: 321-51, bibl. 110

[received 1951].

This review of the literature covers methods of B determination, B availability in soils, and B requirements of plants, including the function of the element, its interrelations with other elements and deficiency symptoms. It has been shown that B plays an important part in cell division and in the synthesis of proteins; in its absence N compounds and sugars accumulate while meristematic tissues die. It is also apparently a necessary component of the cell wall. The B requirements of some common field and vegetable crop plants are indicated.

1307. WARINGTON, K.

**The effect of variations in calcium supply, pH value and nitrogen content of nutrient solutions on the response of lettuce and red clover to molybdenum.**

*Ann. appl. Biol.*, 1950, 37: 607-23, bibl. 16, illus.



The responses of lettuce and red clover grown in nutrient solutions to molybdenum were compared under different conditions of calcium supply, pH value and nitrogen supply. The supply of calcium did not affect the response to molybdenum, which was also practically unaffected by the pH value. Lettuce showed a slower response to molybdenum when nitrogen was deficient, but with inoculated and uninoculated clover there was a good response to molybdenum at the lower nitrogen levels. A rate of 5 p.p.m. was toxic to young plants and was in no case of more benefit than 0.1 p.p.m. The different responses to molybdenum of lettuce and red clover at different nitrogen levels were considered to be due to the different molybdenum requirements of the two plants.—Rothamsted exp. Stat. C.W.S.H.

1308. THOMAS, M. D., HENDRICKS, R. H., AND HILL, G. R.  
Sulfur metabolism of plants. Effect of sulfur dioxide on vegetation.  
*Industr. engng Chem.*, 1950, 42: 2231-5, bibl. 29.

The subjects discussed include: Sulphur fractionation by paper chromatography, tracer experiment studies on S distribution in plants, the effect of SO<sub>2</sub> absorption in sublethal amounts, the mechanism of SO<sub>2</sub> injury, the role of environmental factors in controlling SO<sub>2</sub> absorption by plants and the effect of leaf destruction on yield.

#### *Water, sand and other nutrient cultures.*

(See also 1331s.)

1309. OLSEN, C.  
The significance of concentration for the rate of ion absorption by higher plants in water culture.  
*Physiol. Plant.*, 1950, 3: 152-64, bibl. 13.

The rate of ion absorption for a given ion is independent of the concentration of the ion in the nutrient solution, except for the very lowest concentrations, lying below 0.003 m.e. per l. The number of ions absorbed per unit of time is constant, when absorption takes place from a single salt solution or from a composite nutrient solution, in the latter case, however, only in so far as the proportion between the concentrations of the different ions in the nutrient solution does not change significantly during the experimental period. [From author's summary.]—Carlsberg Laboratory, Copenhagen.

1310. BLANCHARD, F. A., AND DILLER, V. M.  
Technique for growing plants with roots in a sterile medium.  
*Plant Physiol.*, 1950, 25: 767-9, bibl. 6, illus.

A simplified technique for growing plants with their roots in a sterile medium has been developed. Lima beans (*Phaseolus lunatus*) were treated with a bleach solution, then planted aseptically into the top of a specially designed jar unit. The germinating bean forced its root down into the sterile medium in the jar, while the top of the plant pushed itself out into the air. This procedure avoided transfer of the young seedling from a germination container to a growth container. The method may be used for experiments in which it is desired to test the effects of various substances in the

nutrient solution which would be conducive to bacterial or fungal contamination. [Authors' summary.]—University of Cincinnati, Ohio.

1311. HUMPHRIES, E. C.  
The absorption of ions by excised root systems. I. Apparatus and preliminary experiments.  
*J. exp. Bot.*, 1950, 1: 282-300, bibl. 19, illus.

This paper suggests that use may be made of excised roots in the detection of nutrient deficiencies. Seedlings of *Vicia faba*, *Phaseolus vulgaris* and barley were grown in special culture solution tanks with a basic solution (half-strength Hoagland solution), distilled water or various solutions lacking N, P or K. After a period of growth the roots were excised, centrifuged to remove surface water and placed in the absorption apparatus. The roots absorbed the element in which they were deficient, and lost those present in normal amounts. Addition of 2% sucrose increased N and P absorption by P-deficient barley plants. It was found that weed species grown in soil could be lifted without damage or loss of absorption capacity, and their excised roots were able to absorb P or N, depending on which was deficient. Though excised roots from plants in complete nutrient solutions do not behave in the same way as intact plants, in deficient solutions or soils excised roots and intact plants behave similarly.—Rothamsted exp. Stat. C.W.S.H.

1312. HECK, W. W., AND BAILEY, L. F.  
Chelation of trace metals in nutrient solutions.  
*Plant Physiol.*, 1950, 25: 573-82, bibl. 13, being *Contr. bot. Lab. Univ. Tenn. N.S.* 119.

A chelating agent is usually a complex organic molecule which may remove simple metal ions from solution. The possibility is suggested of using such substances in nutrient solutions in direct contact with the roots of growing plants to provide a continuous control of trace element contamination. The present study was undertaken to determine the effect on the plants of 6 such chelating agents added to the nutrient solutions. In germination and seedling studies with tomato, pea, bean, corn and radish and in water culture tests with tomatoes, it was found that concentrations of the reagents which were effective in chelating metal ions produced severe plant injury.—University of Tennessee, Knoxville.

1313. HEWITT, E. J.  
The production of micronutrient deficiencies in plants grown in sand culture and the effects of some of these deficiencies on plant growth.  
*Proc. Fert. Soc.* 10, 1950, pp. 5-12, illus.

The technique of sand cultures for studying micronutrients is described and the effects of such deficiencies on various crop plants are outlined. It is also stated that certain disorders known abroad on fruit trees, such as "little leaf" or "mottle leaf" due to zinc deficiency, and "exanthema" and "summer die back" due to copper deficiency have recently been identified in the R.H.S. gardens at Wisley.—Long Ashton Res. Stat.



1314. STREET, H. E.

**Studies in plant nutrition. II. Further studies of the effect of some organic supplements on the growth of plants in sand culture.**

*Ann. appl. Biol.*, 1950, **37**: 149-58, bibl. 13.

Aqueous leaf mould extract and a yeast extract both increased the weight of radish grown in sand with inorganic culture solution. Leaf mould extract also increased the weight of lettuce. "Bacterized" peat had no effect on radish and was toxic to lettuce. No extract had any effect on oats. The responses obtained could not be accounted for by the auxin content of the extracts. C.W.S.H.

1315. VANTSIS, J. T., AND BOND, G.

**The effect of charcoal on the growth of leguminous plants in sand culture.**

*Ann. appl. Biol.*, 1950, **37**: 159-68, bibl. 13.

Activated charcoal and wood charcoal added to sand culture rooting media increased the growth of pea plants and increased N fixation. Animal charcoal inhibited growth. The activated charcoal was a 1:3 mixture of powdered and granular, manufactured material with an ash content of about 10% consisting mainly of Si, Fe and Al, with 0.5% N. Animal charcoal consists chiefly of inorganic phosphates with only about 10% carbon. Inoculated peas grown with activated charcoal produced smaller numbers of larger nodules which were more active in N fixation; non-inoculated peas also showed increased growth. The possible reasons for these results are discussed, and it is suggested that the charcoal adsorbs excess nutrients and harmful excretions from roots and micro-organisms and maintains a favourable pH. C.W.S.H.

1316. NARAYANA, N., KIBE, M. M., AND ULLAL, R. R.

**Soilless cultivation of plants.**

*Poona agric. Coll. Mag.*, 1950, **41**: 74-89, bibl. 9, illus.

A general account is given of the methods (water, sand and gravel culture) used and of a few preliminary trials conducted at the laboratory of the Agricultural Chemist to the Government, Poona, with crops including tomatoes, chillies, beans and bhendi.

1317. SAUNDER, D. H.

**Some notes on the properties of vermiculite in relation to its use in agriculture and horticulture.**

*Rhod. agric. J.*, 1950, **47**: 409-15.

Comparisons are made between vermiculite and three local soils as regards water-holding capacity at saturation, field capacity and the wilting point, evaporation rates, temperatures and pH values. Various uses to which vermiculite can be put, such as for striking cuttings and for hydroponics, are indicated, and it is mentioned that, while it is probably advisable to select material with a pH value within the normal range, plants have been raised from the seedling stage to maturity in a sample of vermiculite of pH 9.3.

#### *Practical devices.*

(See also 1331e, f, j, 1679, 1687, 1873.)

1318. HOARE, E. R.

**The tractor and horticulture.**

*Fruitgrower*, 1950, No. 2869, pp. 809-10.

The horticultural director of the National Institute of Agricultural Engineering discusses the type of tractor required by the horticultural grower with a one-tractor holding.

1319. ANON.

**Ploeg voor het uitgraven van rozen en bessenstruiken. (A plough for uprooting roses and berry-bearing bushes.)**

*Cult. Hand.*, 1950, **16**: 303, illus.

A description is given of a small two-wheeled plough as used in a Swiss nursery. The wheels can be adjusted for the width between the rows. The ploughshare for removing the bushes can be used to a depth of 40 cm., the depth being regulated by a draw-hook, and the distance between the vertical knives may be up to 45 cm.

1320. BANTA, E. S.

**The brush chipper saves labor.**

*Amer. Fruit Gr.*, 1950, **70**: 12: 16, illus.

The machine described shreds pruning wood into chips of  $\frac{1}{8}$  to  $\frac{1}{4}$  in. which can then be used for mulching.

1321. ANON.

**Soil injectors evolved in N.Z. are efficient.**

*Orchard. N.Z.*, 1950, **23**: 5: 5, illus.

Four models of soil injectors, which have been evolved during the past 4 years in New Zealand, are described briefly and illustrated.

1322. MIALLET, A.

**Explosifs et plantations. (Explosives in agriculture.)**

*Progr. agric. vitic.*, 1950, **134**: 377-82.

A review of the use of explosives on the farm, with particular reference to orchards, under the headings (1) origin of agricultural explosives, (2) their characters, (3) explosive force, (4) method of using them, (5) costs.

1323. ANON.

**Automatic ventilation of storages.**

*Amer. Nurserym.*, 1950, **92**: 10: 7-8, 39-41, illus.

A technical description with diagrams of 2 experimental stores for nursery stock at the Ontario Agricultural College. An automatic ventilating system, controlled by means of a differential thermostat and used with an auxiliary heater when necessary, utilizes the cool outside air and provides the required temperature for the stored products.

1324. DESHUSSES, L.-A., AND HATT, P.

**Étude sur la technique des arrosages. (A study of irrigation technique.)**

*Rev. romande Agric. Vitic.*, 1951, **7**: 1-4, illus.

In Switzerland little research has so far been done to determine the optimum level of irrigation in market garden crops. The authors made a preliminary study of the problem on 3 soil types, and they describe the apparatus they found most suitable for measuring soil moisture. It is an instrument constructed by Bouyoucos which registers the electrical resistance of plaster cells sunk into the soil at depths of 25, 50 and 75 cm. The apparatus and the method of using it are illustrated.



## 1325. NEWHALL, A. G.

**Flash flame soil pasteurizer.**

*Bull. N.Y. St. Flower Gr.*, 1950, No. 63, p. 2, illus.

A new mobile, oil-burning, flash-type soil sterilizer is described. In trials at Cornell, heating soil to 170° F. gave good control of damping off and weed seeds when this was subsequently sown with snapdragons, centaureas, beets, sweet peas and melons.

## 1326. ANON.

**New mixing tool.**

*Fruitgrower*, 1951, No. 2875, p. 198, illus.

An illustrated description is given of a simple device, invented by a Guernsey grower, for mixing the soil in tomato pots. It consists of a revolving shaft fitted with 3 double-bladed propellers and a lid that fits over the pot. A power drive is supplied from a cultivator. It assures even and very fast mixing of soil with the final application of manure or fertilizer before the tomatoes are planted.

## 1327. KRAEVOI, I. M.

**A transplanter for cucurbits and other vegetables.** [Russian.]

*Sad i Ogorod* (Orchard and garden), 1950, No. 12, pp. 57-9, illus.

An illustrated description is given of a transplanting tool, designed at the Kiev vegetable and potato breeding station, which lifts young plants from the seed bed with a cylinder of soil without disturbing their roots.

## 1328. ENNIS, W. B., JR., AND JAMES, D. T.

**A simple apparatus for producing droplets of uniform size from small volumes of liquids.**

*Science*, 1950, 112: 434-6, bibl. 2, illus.

A simple glass apparatus, termed a droplet sizer, is described, which produces, in quantity, individual droplets of uniform size and can be used for delivering very small volumes of aqueous and non-aqueous solutions.

## 1329. PEDERSEN, M. W., AND BOHART, G. E.

**Using bumblebees in cages as pollinators for small seed plots.**

*Agron. J.*, 1950, 42: 523, bibl. 2.

Pollination in enclosures may prove useful for controlled breeding or increasing seed stocks under adverse conditions. A cage used successfully in the production of alfalfa seed in Utah is described. It consisted of a rectangular framework (11.5×21.5×6 ft. high) of ½-in. electrical conduit covered with saran screen. In such cages bumblebees are more manageable than honey bees. Methods of obtaining nests of bumblebees are suggested.

## 1330. MACHACEK, J. E.

**An agar-sheet method of testing the efficiency of seed treating machines.**

*Canad. J. Res., Sect. C*, 1950, 28: 739-44, bibl. 2, illus, being *Contr. Div. Bot. Plant Path., Sci. Serv., Dep. Agric. Ottawa* 1045.

The efficiency of a seed treating machine depends to a considerable extent on the uniformity with which the fungicide used for treatment is mixed with the seed. The uniformity of treatment may be ascertained by placing treated seeds, at 2-in. intervals, on large sheets of inoculated potato-sucrose agar. In the preparation

of these sheets, melted, acidified agar is poured in a uniform layer over panes of glass and, when the agar has solidified, it is dusted heavily with spores of *Penicillium purpurogenum* Stoll. After the treated seed is placed on the agar, the culture is covered with a sheet of glass and incubated for two days at room temperature. The uniformity of treatment may then be determined from the variability in diameter of the zones of inhibition around the seeds. This technique may also be used for determining the comparative potency of different fungicides, and the rate at which they are lost from the seed. [Author's abstract.]

**Noted.**

## 1331.

## a BEAMISH, J. E.

**Land-clearing for agriculture in British Columbia.**

*Bull. Dep. Agric. B.C.* 85, revised 1950, pp. 49, illus.

## b BENTLEY, J. A.

**An examination of a method of auxin assay using the growth of isolated sections of *Avena* coleoptiles in test solutions.**

*J. exp. Bot.*, 1950, 1: 201-13, bibl. 19.

## c BLACK, W. A. P., AND OTHERS.

**An improved method for the estimation of combined fucose in seaweeds.**

*J. Soc. chem. Ind. Lond.*, 1950, 69: 317-20, bibl. 6.

## d BOX, G. E. P.

**Problems in the analysis of growth and wear curves.**

*Biometrics*, 1950, 6: 362-89, bibl. 22.

## e BUCHHOLTZ, K. P.

**A carbon dioxide powered sprayer for small plots.**

*Agron. J.*, 1950, 42: 614, bibl. 2, illus.

## f CUMINGS, G. A.

**A fertilizer hopper for accurately applying either radioactive or ordinary fertilizers on experimental plots.**

*Agron. J.*, 1951, 43: 46-7, illus.

See also *H.A.*, 21: 84.

## g EDINBURGH SCHOOL OF AGRICULTURE.

**Teaching unit guide to field experiments, demonstrations and farm crops: Boghall farm, Easter Howgate, Castlelaw and Fulford, Easter Bush, Dryden Mains.**

[*Publ.*] *Edinb. Coll. Agric.*, 1950, pp. 83.

## h FUJITA, T.

**Zur Kenntnis der Organstellungen im Pflanzenreich. (On organ arrangement in the plant kingdom.)**

*Jap. J. Bot.*, 1942, 12: 1-56, bibl. 102, illus. [received 1950].

With many examples from garden plants.

## i GENKEL, P. A., AND CVETKOVA, I. V.

**The effect of salts on the viscosity of protoplasm and the heat resistance of plant cells.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 74: 1025-8, bibl. 4.



- j GILLIS, J., HOSTE, J., AND FERNANDEZ-CALDAS, E.  
La cuproína como reactivo para la determinación espectrofotométrica de trazas de cobre en los vegetales. (Cuproine as a reagent in the spectrophotometric determination of traces of copper in plants.) *An. Edaf. Fis. veg. Madrid*, 1950, 9: 585-91, bibl. 2.
- k HARLEY, J. L.  
Recent progress in the study of endotrophic mycorrhiza. *New Phytol.*, 1950, 49: 213-47, bibl. pp. 4.
- l KAKUKAWA, T.  
Ueber das Redoxpotential des Pressaftes einer etiolierten Pflanze, *Vicia faba* und die Potentialveränderung einiger Substrate unter der Einwirkung des von der betreffenden Pflanze extrahierten Enzyms. (On the reduction-oxidation potential of the expressed juice of etiolated *Vicia faba* plants, and on the change in the potential of some media under the influence of the enzyme extracted.) *Sci. Repts. Tôh. Univ.*, 1941, 16 (4th series): 305-30, illus., from abstr. in *Jap. J. Bot.*, 1942, 12: (9)-(10) [received 1950].
- m KANDLER, O.  
Zur Frage einer endogenen Wachstumsrhythmik bei in vitro kultivierten Maiswurzeln. (An endogenous growth rhythm of maize roots cultured in vitro.) *Biol. Zbl.*, 1951, 70: 64-70, bibl. 16.
- n MILNE-REDHEAD, E.  
Variation in leaf-shape within a species: some examples from the Gold Coast. *Kew Bull.*, 1950, No. 2, p. 261+3 pp. illus.
- o ÖBLOM, K.  
Effects of nutrition of *Marasmius urens* upon the production of antibiotic substances. *Nature*, 1950, 166: 950-1, bibl. 3.
- p OGG, W. G.  
Weather and food. *Centenary Proc. roy. met. Soc.*, 1950, pp. 239-43.
- q SHAW, A. C., AND TATCHELL, R. T.  
Distribution of vitamin C in the tip of the broad bean radicle. *Nature*, 1951, 167: 116-17, bibl. 1.
- r SMALL, J.  
A note on sugar and starch in stomatal guard-cells. *New Phytol.*, 1950, 49: 274-6, bibl. 3.
- s TICQUET, C. E.  
Soilless culture: recent developments. *Agriculture, Lond.*, 1951, 57: 484-6, bibl. 6. Based on information in the U.S. Army files [see also *H.A.*, 21: 97].
- t TRAUTNER, E. M., AND ROBERTS, E. A. H.  
The chemical mechanism of the oxidative deamination of amino acids by catechol and polyphenolase. *Aust. J. sci. Res., Ser. B*, 1950, 3: 356-80, bibl. 28.
- u VELDSTRA, H.  
La balance hydrophile/lipophile des composés organiques, son importance pour leur action physiologique. (The hydrophilic/lipophilic balance of organic compounds, and its effect on their physiological activity.) Reprinted from *Bull. Soc. Chim. biol.*, 1949, Vol. 31, Nos. 3-4, pp. 29, bibl. 37, illus. [received 1951].
- v WILSON, J. B.  
The use of ion-exchange resins in the determination of fruit acids. *J. Ass. off. agric. Chem. Wash.*, 1950, 33: 995-1002, bibl. 8.
- w WOLFE, J. W.  
A pumping manual for irrigation and drainage. *Stat. Bull. Ore. agric. Exp. Stat.* 481, 1950, pp. 39, bibl. 7, illus.

## TREE FRUITS, DECIDUOUS.

### General.

(See also 1259, 1322, 2113, 2115, 2118, 2142, 2143, 2160, 2184.)

1332. KEMMER, E., AND SCHULZ, F.  
Die deutschen Obstbauverhältnisse im Lichte der Vor- und Nachkriegsstatistik. (German fruit growing statistics before and after the war.) *Merkbl. Inst. Obstb. Berlin*, 15, 1950, pp. 24.  
The methods of compiling and presenting fruit statistics in Germany before and after the war are compared, and the numerous difficulties encountered, including frontier adjustments and the division of the country into 4 zones, are pointed out. Tabulated figures supplied relate to numbers of fruit trees, total production and production per head of population, while maps show the distribution of fruit trees per head of population and density of fruit trees per ha. of agricultural

land. Import figures are provided and mention is made of survey methods practised abroad and of the latest fruit tree population and production figures available.

1333. LUCHINI, R.  
Il Sud Mendoza e la sua agricoltura. (South Mendoza and its agriculture.) *Riv. Agric. sub trop.*, 1950, 44: 229-64.  
This account of agriculture in the South Mendoza region of Argentina includes viticulture, fruit growing, and olive growing.
1334. SVENSON, B.-G.  
Skånska östkustens fruktodlingar och deras ekonomisk-geografiska betingelser. (The economic-geographical conditions of fruit growing in eastern Skåne.) [English summary 1½ pp.] *Svensk. geogr. Årsb.*, 1950, 26: 61-83, bibl. 21.



After the last war fruit-growing in Sweden increased considerably in importance, the economic value of the 1948 apple crop alone (170 million kg.) exceeding that of wheat production. In eastern Skåne, where this development has been particularly rapid, an area of sandy soil of low water-holding capacity, with an annual rainfall of only 20-24 in., has been transformed into valuable fruit land within the last few years. All the best orchards are situated in a 4-6 km. wide belt along the coast, where the proximity of the sea prevents the occurrence of spring frosts and extends the season in the autumn; farther inland, crop failure due to frost or hail is not infrequent. In 1949 the number of fruit trees in the county had risen to over 365,000, about 30% being Cox's Orange. The possibility of apple exports from Sweden is envisaged.

1335. DUHANIN, K. S.

Transplanting mature fruit trees and bushes.  
[Russian.]

*Sad i Ogorod* (Orchard and garden), 1950,  
No. 10, pp. 28-31.

Large-scale transplantings of fruit trees up to 15 years of age are recorded. The operations were carried out in the Moscow region, either in the spring or autumn, and the necessary precautions to be taken when transplanting with a ball of earth or without are described. Transplanting of fruit bushes, while simpler, also requires due care.

1336. GOULD, P. H.

El cultivo de la higuera. (The cultivation of the fig.)

[Publ.] *Minist. Agric. Guatemala* 26, 1950,  
pp. 11.

Directions to growers, briefly covering propagation, planting, soil cultivation, pruning, eelworm damage, varieties, handling of the fruit and transport of fresh figs.

1337. COETZEE, W. H. K., HUGO, J. F. DU T.,

AND PRATT, F. F.

The Mexican hawthorn. An investigation of its possibilities for the processing industry.

*Fmg S. Afr.*, 1950, 25: 361-2, illus.

Analyses showed *Crataegus pubescens* fruits to be an important source of pectin, yielding more than double the quantity obtainable from an equal weight of citrus fruits. The berries were also found to be very rich in carotene. Canned fruit and jelly are described as attractive.

1338. BROOKE, J.

Out-door peach growing.

*J. roy. hort. Soc.*, 1951, 76: 22-33, illus.

The main points in the cultivation of peaches in England are discussed. Notes are given on propagation and rootstocks, choice of varieties, selection of soil, climate, fertilizers, pruning, thinning, and pest and disease control.

1339. FRENCH, B. O., AND VINCENT, A. E.

A planting policy for the canning peach industry in the Murrumbidgee Irrigation Area.

*Agric. Gaz. N.S.W.*, 1948, 59: 212-15, 251-4;  
1949, 60: 183-8; 1950, 61: 121-3, 130, 193-8,  
249-51, 299-301.

In this series of articles the following points are discussed: (a) the effect in the past of planting varieties in the Murrumbidgee area without reference to the capacity or requirements of canning factories, (b) the processing problems arising from this, (c) data from a field trial with a number of imported and other varieties, (d) the characteristics considered in assessing quality and assessing varieties under the scale of points adopted, (e) details of points allotted together with comments, (f) conclusions and recommendations. The unbalanced planting of the Golden Queen variety in particular is mentioned, and the need for new varieties to advance the start of the peach harvest in the area is indicated. Field and canning data for a number of new varieties under trial are given and reasons advanced for the rejection or retention of certain new varieties.

1340. THOMAS, P. H.

Peach and nectarine growing in Tasmania.

*Tasm. J. Agric.*, 1950, 21: 254-61, illus.

The culture of peaches and nectarines in Tasmania is discussed under soils and location, propagation of nursery trees, varieties, dormant pruning, the application of fertilizers, irrigation, soil cultivation, harvesting and packing, and diseases and pests. Little canning is carried out and production is largely confined to dessert varieties.

1341. AUBIN, L.

Les fruits de luxe. (Luxury fruit.)

*Rev. hort. Paris*, 1950, 122: 202-5, illus.

The production of luxury and out-of-season fruit is a special feature of the Paris suburbs. Forced cherries, strawberries and peaches, and choice specimens of Doyenné du Comice and Passe-Crassane pears and of Calville blanc and Reinette du Canada apples are produced for the luxury hotel trade in Paris. Marked fruit, imprinted with a picture or lettering by shading a portion of the skin during the period of ripening, is also a Parisian speciality. Some aspects of the production and presentation of these luxury fruits are dealt with. A striking aerial photograph shows the layout of the east suburbs where 500 ha. of walled gardens are used for growing espalier trees.

*Breeding and varieties.*

(See also 1399c, d, f, 1466, 2174.)

1342. MAKSIMOVA, M. P.

Valuable local fruit varieties in Azerbaijan.

[Russian.]

*Sad i Ogorod* (Orchard and garden), 1950,  
No. 10, pp. 31-3, illus.

The main species grown are apples, pears and stone fruits, followed by quince, hawthorn and medlar. Over 100 local apple and pear varieties are grown in the Kubinsk region alone, the most important ones being described.

1343. WARREN, S., JOHNSON, M., AND RISSINGER, M.

Freezing foods at home.

*Circ. Pa agric. Ext. Serv.* 369, 1950, pp. 28,  
illus.

This general account of techniques for home freezing includes lists of the varieties of 15 fruits and 22 vegetables found most suitable for quick-freezing in Pennsylvania.



1344. MAYÉRAS, R.

La pomme de Lestre. (The apple variety De Lestre.)

Rev. hort. Paris, 1950, 122: 222-3, illus.

The variety De Lestre, grown in France under various local names, including Reinette de Brive, Sainte-Germaine and Comte, is an excellent late dessert apple but has two serious faults: on seedling stock it comes into bearing very late, after 20-25 years, and it is a biennial bearer. The author has found that by grafting De Lestre onto a dwarfing stock, Paradis noir, Jaune de Metz or Doucin, it can be induced to bear considerably earlier and more regularly. On seedling stocks, bending down the more vigorous branches ("arcure") had a similar beneficial effect. Preliminary experiments in the use of selected scion wood from early-bearing parent trees have had promising results.

1345. ANON.

New apple named.

Amer. Nurserym., 1950, 92: 11: 47.

The characters of the new apple "Monroe" (Jonathan × Rome Beauty), raised at the New York agricultural experiment station, are described. The fruit is yellow-fleshed, of good quality and keeps well in storage.

1346. WOODHEAD, C. E.

New apple and peach varieties.

Orchard. N.Z., 1950, 23: 2: 4-5.

Brief descriptions are given of: *Apple varieties* (dessert) Laxton's Epicure, Ellison's Orange, Laxton's Superb, Laxton's Royalty; *Apple varieties* (culinary) Golden Noble, Monarch; *Peach varieties* Buttercup, Rosebud, Aunt Becky, Watton, Robert Stewart. These varieties have shown sufficient merit to warrant further trials in New Zealand.

1347. ZELENSKIĬ, M. A.

Breeding frost resistant hybrid cherries.

[Russian.]

Sad i Ogorod (Orchard and garden), 1950, No. 12, pp. 34-5.

A brief account of an experiment in which hybrids of Frances ♀ × Žabule ♂, raised from seeds sown immediately after harvest, proved to be considerably more frost resistant than either of the parent varieties.

1348. HOTTA, T.

Contributions to the knowledge of the systematics of *Morus* in Japan XV-XVII.

*Morus* in cultivation X-XII.

Bot. Mag. Tokyo, 1939, 53: 292-6, 327-8, 335-8, 358, 386-91, 422, from abstr. in

Jap. J. Bot., 1940, 11: (10) [received 1950].

Seventy cultivated forms of *M. bombycis*, 39 of *M. latifolia* and 31 of *M. alba* are established, several new forms and varieties being noted.

1349. BREVIGLIERI, N.

La pesca J. H. Hale. (The peach J. H. Hale.)

Ital. agric., 1950, 87: 670-81, bibl. 11, illus.

The origin, distribution, and details of morphological characters of the J. H. Hale peach are described. The percentages of the areas under this variety in relation to others in the peach growing regions of Italy in recent years are set out, and show its increasing popularity.

1350. NEPOROŽNYĬ, G. D.

New pear varieties for the Voronež region.

[Russian.]

Sad i Ogorod (Orchard and garden), 1950, No. 12, pp. 28-30.

The central zone of Russia with its continental climate has very few good pear varieties. Breeding trials, started in 1937, produced a number of hardy seedlings of which the 7 best are described here for the first time.

1351. MORETTI, A.

La Passacrassana. (The Passe-Crassane pear.)

Ital. agric., 1949, 86: 644-6, illus.

A historical account of the pear variety Passacrassana or Passe-Crassane with illustrations of its flowers and fruit.

1352. SWERTS, E.

Een nieuwe vroege pruim voorlopig genaamd "Gerlax". (A new early plum provisionally named Gerlax.)

Cult. Hand., 1950, 16: 603.

In order to obtain an early plum of as good quality as Ruth Gerstellen but more fruitful, this variety was crossed with Early Laxton, and a hybrid was obtained which is here briefly described.

*Morphology and growth.*

(See also 2174.)

1353. AARON, I., AND CLARKE, W. S., Jr.

Structure of wood allows breakage of apple limbs.

Science for the Farmer, Dec. 1950, p. 11, illus., being Suppl. 63rd A.R. Pa agric. Exp. Stat. 1949/50 1.

For a more detailed account of this work, see Proc. Amer. Soc. hort. Sci., 1949, 54: 57-60 [H.A., 20: 1428].

1354. BOYNTON, D., AND HARRIS, R. W.

Relationships between leaf dimensions, leaf area, and shoot length in the McIntosh apple, Elberta peach, and Italian prune.

Proc. Amer. Soc. hort. Sci., 1950, 55: 16-20.

It is shown that leaf area for each species was closely related to both length and width of leaf and also to shoot length. Some consequences are discussed. Correlations are based on variation both between and within treatments taken together. S.C.P.

1355. DAVIS, L. D.

Size in canning peaches. The relation between the diameter at harvest and the growth made after reference date.

Proc. Amer. Soc. hort. Sci., 1950, 55: 212-16, bibl. 1.

Defining size as suture diameter, a "reference date" is given (corresponding usually to about 50% growth) at which final size can be estimated. Correlations are presented for size at harvest with both size at reference date and subsequent growth, the latter being the larger. Only correlations within treatments are considered.

S.C.P.



**Propagation.**

(See also 1323, 1399k, 2174.)

1356. SOLOVJEVA, M. A.

**Fruit seed storage.** [Russian.]

*Sad i Ogorod* (Orchard and garden), 1950,  
No. 10, pp. 24-8.

A laboratory investigation in the Ukraine was made to determine the optimum storage conditions for apple, pear, apricot, cherry-plum and sour cherry seeds used for seedling rootstock propagation. Highest germination was obtained when the seeds were stored in an atmosphere of 50-55% relative humidity, the percentage germination decreasing with increasing moisture content. Tabulated results show that apple seed germination was most adversely affected by storage in a damp atmosphere, pear seed germination less so, and apricot and cherry-plum least of all.

1357. STEPANOV, S. N.

**Preparing seeds of fruit trees for sowing.**

[Russian.]

*Sad i Ogorod* (Orchard and garden), 1950,  
No. 11, pp. 19-23.

This article discusses the stratification of fruit tree seeds, and includes a table showing the number of days taken for the germination of the seeds of a number of apple varieties and hybrids, following stratification at 5-6° C.

1358. SNYDER, J. C., AND BARTRAM, R. D.

**Grafting fruit trees.**

*Ext. Bull. Wash. St. agric. Ext. Serv.* **442**,  
1950, pp. 34, illus.

Explicit directions for growers concerning the technique of commercial grafting, including collection, preparation and storage of scion wood, time of grafting and budding, methods of grafting (the cleft, stub, bridge, inarch and bench grafts and budding), and care of the grafts. The subjects of double-working, compatibility and rootstocks are scarcely touched on. The photographs are clear and useful.

1359. SWERTS, E.

**Dwarsgriffel of griffel van Hern. (The transverse or van Hern graft.)**

*Cult. Hand.*, 1950, **16**: 301, illus.

The type of frameworking described is carried out in spring when the bark is easily lifted. The scion graft stick, with 2 or more buds, is cut thin (scythe-shaped if possible) with the end of a small pruning knife. In the branch a D-shaped or triangular cut, or a longitudinal slit if the bark is thin, is made, the bark raised with a small flexible-rod, and the scion inserted so that it stands out at right angles to the branch. The union is not tied up, but merely smeared with grafting wax. The method is very suitable for furnishing bare lengths of branches with fruit spurs. It is very similar to the awl- or slit-graft used in other countries.

1360. GAYFORD, G. W.

**Orchard notes. Budding stone fruits.**

**Getting size into canning peaches.**

*J. Dep. Agric. Vict.*, 1951, **49**: 23-4, illus.

Brief accounts are given of (1) budding stone fruits, with illustrations showing portions of bud-sticks of plum, peach and apricot, and stages in the budding

operation; (2) improving size of canning peaches by fertilizers, thinning and irrigation.

1361. KASJANENKO, A. I.

**The biological and horticultural characteristics of trees on their own roots.** [Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1950,  
**15**: 9: 21-6, bibl. 5, illus.

The author concludes from his observations and experiments that all the varieties of apple, plum, and apricot tested grew well on their own roots and produced a vigorous root system the first year, but cherries and peaches rooted feebly. Pears rooted only when the layered one-year-old shoots were laid horizontally in shallow furrows and fragments of brick inserted in cuts made below the buds. In the Victoria plum own-rooted trees grew better than grafted trees. All the varieties of apple tested produced larger and heavier fruit on own-rooted trees than on grafted trees.

**Rootstocks.**

(See also 1344, 1399 l, 2126, 2150, 2166, 2168, 2179.)

1362. SCHWARTZE, C. D., AND MYHRE, A. S.

**Research on fruit tree dwarfing stocks.**

*Amer. Nurseryman*, 1950, **92**: 9: 7-8.

In general, there is still no satisfactory dwarfing rootstock for any stone fruit. *Prunus mahaleb* produces only slight dwarfing effects on cherries, and, although some species of sand cherry have been used to produce true dwarfs, there is insufficient information on the behaviour of sweet and sour varieties worked on them. Peaches, nectarines and apricots have been dwarfed by budding onto seedlings of the European plum, *Prunus institia*, and the American wild plum *P. americana*, and there has been some experimental work with the sand cherry. Trials with Malling A, B and C quince rootstock for pears are being started at the Western Washington Experiment Station at Puyallup. For apples, Malling IX seems to be the ideal rootstock for dwarf trees and Malling VII is the most promising for the production of semi-dwarfs. The propagation of Malling rootstocks under western Washington conditions, and their compatibility with commercial varieties are discussed.

1363. WILKINSON, B. R.

**Rootstocks for prairie tree fruits.**

*Rep. Proc. west. Canad. Soc. Hort.*, Winnipeg, 1950, pp. 41-4.

Under prairie conditions rootstocks must possess a high degree of winter hardiness, resistance to sunscald and to pests and diseases, and tolerance to drought and high soil alkalinity. At the Dominion Experimental Station at Morden, Manitoba, work on apple and crab-apple stocks shows progress, though no clonal rootstock is as yet recommended. Seedlings of Columbia, Bedford and Osman are at present suggested for general apple propagation work, together with *Malus baccata*. The position with pear rootstocks is less satisfactory. The most desirable stocks for plum propagation are the seedlings of *Prunus americana* varieties such as Wastesa and Zekanta. No satisfactory rootstock for cherries has yet been found. Seedlings of mazzard and the somewhat better mahaleb have been used for sour cherries. Commonly used rootstocks for apricots include *Prunus sibirica*, *P.*



*manchurica*, and hybrids between *P. sibirica* and the commercial apricot (*P. armeniaca*), an example of which is the "Yeager hybrid".

1364. MARGOLIN, A. F.  
Dwarf apples in the Moscow region. [Russian.]  
*Sad i Ogorod* (Orchard and garden), 1950,  
No. 12, pp. 5-7.

The most popular rootstocks are the narrow-leaved, relatively vigorous type Doucin III, which produces semi-dwarf trees 2.5 to 3.5 m. high, and the narrow-leaved dwarf Paradise VIII on which varieties grow up to 1.8 m. The broad-leaved dwarf Paradise IX was imported a few years ago and is still rarely used. Results of 15 years' experiments have shown Doucin III to be frost resistant; Paradise VIII is somewhat less hardy. During trials in the Moscow region Paradise IX was found to be frost susceptible, and is now recommended only for the southern regions (Moldavia and Georgia); on the other hand, it is reported from Latvia to have survived the extremely severe winters of 1941/42 and 1946/47. Varieties suitable for cultivation as dwarf trees are listed.

1365. BUDAGOVSKIĬ, V. I.  
Root characteristics of dwarf apples in Dagestan. [Russian.]  
*Sad i Ogorod* (Orchard and garden), 1950,  
No. 12, pp. 7-9.

A description is given of dwarf apple bushes grown for fruit on their own roots from cuttings or layers. They form bushes 150-160 cm. high with little or no stem. All these dwarf apples in their morphological and growth characters resemble the Paradise stock, type VIII, and one was actually identified as this stock. The great possibilities for rootstock selection work among these dwarf apples are indicated.

1366. KORDON, R. JA.  
The Caucasian dwarf apple. [Russian.]  
*Sad i Ogorod* (Orchard and garden), 1950,  
No. 12, p. 10.

"Hamanduli", the Georgian name for a frost-resistant dwarf apple, is grown for its fruit, but it is also known to be a good rootstock. It is very similar to Paradise except that it is a regular bearer, whereas Paradise produces fruit only rarely. It is claimed that the so-called English and French Paradise originated from "Hamanduli", brought to western Europe from the Caucasus.

1367. SMIRNOV, V. F.  
The classification of dwarf apple types. [Russian.]  
*Sad i Ogorod* (Orchard and garden), 1950,  
No. 12, pp. 10-12.

The two foremost Soviet workers on dwarfing rootstocks, V. I. Budagovskiĭ and A. F. Margolin, found 7 types [named here] to be identical with EM. II, III, IV, V, VI, VIII and IX respectively. The author criticizes the East Malling classification on the grounds that there are many valuable rootstocks in Russia not included in the 16 Malling types. To avoid confusion he proposes that all rootstocks be called by their original Russian names. A new Soviet classification is suggested, which, while retaining the Russian terminology, would group all semi-dwarfs under Doucin and true

dwarfs under Paradise. The native country of the most important dwarfing rootstocks is stated to be the Soviet Union; EM. VIII originates from the dwarf apple Marga Hudzor, grown in Armenia, and EM. IX appears to be identical with Hamanduli, widely cultivated in Georgia.

1368. PADFIELD, C. A. S.  
The effect of rootstocks and intermediate scion varieties on the cool-storage disorder, core-flush, in Granny Smith apples.  
*N.Z. J. Sci. Tech. Sect. A*, 1949 (published May 1950), 30: 271-5, bibl. 2.

Core-flush, a form of internal tissue collapse, is a major disorder of Granny Smith apples in cool store. Different rootstocks and intermediate scion varieties showed no consistent effect on the incidence of this disorder. There were wide seasonal variations in the incidence of core-flush, in successive crops from trees under test. [From author's summary.]-D.S.I.R., Wellington.

1369. JACOBONI, N.  
Affinità e intensità metabolica nell'olivo innestato. (Compatibility and metabolic activity in grafted olive trees.)  
*Ital. agric.*, 1950, 87: 654-6, bibl. 5, illus.

A study of the behaviour of the two varieties Moraiolo and Frantoio when grafted on each other and on woodland seedlings. The results indicate the greater vigour imparted by grafting on the wild seedling.

1370. REIMER, F. C.  
Development of blight resistant French pear rootstocks.  
*Stat. Bull. Ore. agric. Exp. Stat.* 485,  
1950, pp. 24, illus.

French pear seedlings (*Pyrus communis*) are very widely used in America as rootstocks for pears, but the species has proved highly susceptible to pear blight, a bacterial disease caused by *Erwinia amylovora*. Since 1923, a total of 9,202 French seedlings has been tested at the Southern Oregon Branch Experiment Station for resistance to blight. Of these, only 12 trees showed a high degree of resistance. The best of these 12 trees were tested to determine whether they would transmit the resistance to their progeny, the resistant variety Farmingdale being used as the male parent in most cases. All the resistant parent trees produced a much higher percentage of resistant seedlings than did the susceptible controls, P18 and W1 being outstanding in the production of seedlings resistant to root blight. The seedlings remained resistant when budded with susceptible scion varieties. P18 has the advantage of producing large quantities of seed per acre. Growers in districts where pear blight is a serious problem are recommended to use P18 x Farmingdale seedlings as the rootstock, with an intermediate stem piece of either P18 or P87. In districts where blight is less destructive P18 x Farmingdale may be low-worked directly with the scion variety.

1371. RJADNOVA, I. M., AND VASILENKO, T. S.  
Rejuvenating fruit trees. [Russian.]  
*Agrobiologija* (Agrobiology), 1950, No. 5,  
pp. 142-5, illus.

Data are presented to show the effect of scion-rooting in a number of apple varieties worked on Paradise (type VIII) rootstock.



**Pollination and bees.**

(See also 1329.)

1372. GOLUBINSKIĬ, I. N.

**Birch tree sap as a medium for germinating pollen grains.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1949, 68: 773-5, bibl. 8 [received 1951].

Data obtained with pollen grains of white willow (*Salix alba*), bullace (*Prunus insititia*), *Prunus padus*, *Primula obconica* and *P. officinalis* (cowslip), show that birch sap serves as a more favourable medium for the germination of pollen grains than do sugar solutions.

1373. GRIGGS, W. H., VANSSELL, G. H., AND REINHARDT, J. F.

**The germinating ability of quick-frozen, bee-collected apple pollen stored in a dry ice container.**

*J. econ. Ent.*, 1950, 43: 549, bibl. 4.

In recent experiments at the University of California, Davis, quick-frozen samples of bee-collected apple pollen have given as high as 96% germination after 7 months in a dry ice container.

1374. LOBANOV, G. A.

**The effect of different quantities of pollen on fertility.** [Russian.]

*Agrobiologija* (Agrobiology), 1950, No. 3, pp. 78-86.

The pollination of fruit plants with large amounts of pollen (completely covering the stigmas) results in the greatest fertilization in intravarietal and intervarietal crossings and in the hybridization of more distantly related forms. Positive results of this action are seen not only in seed production but also in the development of the pericarp, particularly in plants with many-seeded fruits. The progeny from such heavy pollination shows great evenness and viability. Data are tabulated for the apple variety Moscow Grushovka and other fruits.

1375. BÓTTARI, V., AND SPINA, P.

**Ricerche sulla impollinazione di alcune varietà di olivo coltivate in Sicilia. (Studies on the pollination of some varieties of olive cultivated in Sicily.)**

*Ann. Sper. agrar.*, 1950, 4: 1007-22, bibl. 22.

Observations on a number of auto-sterile and auto-fertile varieties are recorded. In an appendix the formation of pseudo-drupes is mentioned.

1376. FAHN, A.

**Studies in the ecology of nectar secretion.**

*Palest. J. Bot. (J.)*, 1949, 4: 207-24, bibl. 7 [received 1951].

The studies described here were carried out in several localities in Palestine from 1944 to 1947. A new method for the quantitative measurement of nectar, involving the use of a special type of pipette, is described. The daily secretion of nectar was measured in 66 ornamental and economic plants, among the latter being 13 varieties of citrus, *Poncirus trifoliata*, one banana, one pear, and three apple varieties. The daily secretion per flower ranged from 0.13 mg. fresh nectar with 0.10 mg. dry weight to 267.75 mg. fresh nectar with 74.37 mg. dry weight. The quantity of nectar depended, among other things, on the volume of the nectariferous tissue.

The concentration of dry matter in the nectar varied from 14 to 87%. Some plants were found to secrete reducing sugar only, some non-reducing sugar, and others both kinds of sugar in different proportions, which in some families proved to be more or less constant. No connexion was found between the quantity and concentration of secreted nectar and the systematic position of the plant. Nectar secretion, especially in open nectaries, was found to be influenced by air humidity, a clear inverse relationship existing between nectar concentration and relative atmospheric humidities at different times of the day. In general, high temperature and high soil humidity both promoted nectar secretion, though following irrigation the effect was not exerted until one or two days later. In the daily rhythm of secretion maximum secretion generally occurred in the fore- or afternoon, though in *Capparis sicula* the maximum occurred at night. During the life of single flowers the highest secretion occurred, in most cases, on the first day after opening and the lowest on the last day of their life. The rate of secretion of the flower also declined with the age of the inflorescence. Considerable differences in the rate of secretion were found between male and female flowers of the same species. In *Tecomaria capensis* nectar secretion appeared to be conditioned by root pressure, whereas in other plants local pressure in the tissues surrounding the nectary sufficed. In this species, too, secretion could be stopped almost entirely by injuring the nectary.

1377. GRANT, V.

**The flower constancy of bees.**

*Bot. Rev.*, 1950, 16: 379-98, bibl. 69.

This is a review of observational and experimental work on the behaviour of bees when visiting areas where many species and varieties of flowers are to be found. The genus *Apis* has been shown to be more constant than *Bombus* in its flower-visiting. Constancy to one kind of flower may be related to constancy to one locality. Some bees, however, particularly those arriving late in an area, become "wanderers" and are responsible for much wide cross-pollination within plant populations. Constancy has also been estimated by examination of pollen loads. Frisch's experiments are described; these proved the colour sense of bees to blue, yellow, white and black. There are frequent records of bees moving freely between different colour forms of the same species, but between other well-marked floral characters bees show much greater discrimination. Various views of the origin of flower constancy are given, and it has been shown that constancy is greatest in insects which are most highly adapted for pollination. The relation between the evolution of angiosperms and flower constancy is discussed, and it is suggested that those angiosperms which, by the development of their floral parts, have imposed flower constancy on bees have undergone most diversification of flower characters. C.W.S.H.

1378. RIBBANDS, C. R.

**Changes in the behaviour of honey-bees following their recovery from anaesthesia.**

*J. exp. Biol.*, 1950, 27: 302-10, bibl. 17.

During the development of a marking technique which necessitated anaesthetizing honey-bees, certain after-effects of anaesthesia were noticed. This work is a comparison of the after-effects of treatments with

CO<sub>2</sub>, N, and chloroform on foraging behaviour, sequence of hive duties, and longevity of the bees. Chloroform treatment had no after-effects on the pollen-gathering capacity, longevity or memory of bees; chloroform is therefore considered a suitable anaesthetic for use in experiments with bees where individual marking is necessary. CO<sub>2</sub> and N treatments did not affect the memory or longevity of bees, but they either eliminated or markedly reduced their pollen-collecting tendencies. They reduced brood-rearing and wax-secreting activity and caused the bees to forage at an early age. The factor common to CO<sub>2</sub> and N treatments is lack of oxygen. The theoretical and practical possibilities of these results are discussed. It is suggested that properly applied CO<sub>2</sub> treatments of whole colonies might prevent swarming by converting the temporary excess of nurse bees into foragers, and that they might also be useful for increasing honey production in certain localities where brood-rearing is excessive.—Rothamsted exp. Stat.

1379. MAYER, K.  
Bienen und Pflanzenschutz. (Bees and plant protection.)  
*NachrBl. dtsh. PflSchDienst, Berlin*, 1950, 4: 201-5, bibl. 29.

Insecticidal treatments are discussed in relation to their effect on bees. The lethal concentrations of a number of chemicals are given, and the inclusion of bee repellents, such as 1% lead arsenate or 0.5% nicotine sulphate, in the usual fruit tree sprays is recommended. In Thuringia and Mecklenburg, with the exception of potatoes, grapevines and asparagus, the treatment of plants in flower is forbidden, and, as an additional precaution, warning is given to beekeepers of impending insecticidal treatments.

1380. BOUGARD, M.  
Les abeilles et les insecticides toxiques.  
(Bees and toxic insecticides.)  
*Fruit belge*, 1950, 18: 122-4.

The harmful effects on bees of the insecticides used in orchards is emphasized. The rather stable materials should be used at the "green bud" and "pink bud" stages, the very temporary ones just before flowering, and those more persistent 3 to 4 weeks before blossoming.

#### Soil management.

(See also 1399b, e.)

1381. BOULD, C.  
The effect of soil management on soil fertility and tree nutrition.  
*Grower*, 1950, 34: 1217-18.

Following a brief general discussion, a trial at Long Ashton is mentioned in which grass and other cover crops were compared with clean cultivation in a cider apple orchard. The results indicate that a grass cover in general increases the uptake by the trees of K and P and reduces their uptake of N and Mg.

1382. LOEWEL, E. L.  
Die Frage der Bodenbearbeitung und Unterkultur unter den Obstbäumen. (Soil cultivation and cover crops under fruit trees.)  
*Mitt. ObstbVersuchsring Jork*, 1951, 6: 1: 2-3.

It is recommended that the marshland soils of the lower

Elbe region be left under grass and mowed frequently, that on sandier soils green manure crops be grown, and that very light soils less suited to apple growing be clean cultivated throughout the season.

1383. HERR, F.  
Vorzeitige Vergreisung unserer Apfelbuschanlagen. (Premature ageing of bush apple plantations.)  
*Mitt. ObstbVersuchsring Jork*, 1951, 6: 1: 3-5.

After 12 to 15 years bush plantations in Germany, the majority grown on M. IX rootstock, show signs of declining growth and yields. The trees produce little new wood and become liable to pest and disease attack and the fruit remains small. The author considers soil exhaustion to be the cause and recommends the following procedure to improve soil conditions: clean cultivation till the middle of July, after which a green manure crop is sown or weeds are allowed to grow. Both types of cover are mown but are not turned under till the early spring.

#### Water relations.

(See also 1331w, 1534.)

1384. KONCZEWSKI, C.  
L'adaptation des variétés de pommiers au terrain. (The adaptation of apple varieties to soil conditions.)  
*Rev. hort. Paris*, 1951, 123: 329-31, illus.

The behaviour of 22 apple varieties on 4 soil types with different water levels was studied in Poland over a number of years. The observations made are recorded in tabular form.

1385. TAGUCHI, R.  
The seasonal variation in the content of water and reserve materials in the stem and roots of the mulberry tree. [Japanese, German summary.]  
*Bul. sci. Fak. Terkult. Kyûsyû imp. Univ.*, 1939, 8: 350-73, from abstr. in *Jap. J. Bot.*, 1940, 11: (34) [received 1950].

The fairly high water content found during the growth period in early spring decreased gradually towards early summer, rose to a maximum in midsummer and finally decreased with the approach of winter. The carbohydrate content of the shoots and roots rose gradually during the early growth period, decreased in midsummer when growth was most vigorous, and rose to a maximum in late autumn. The variation in fat content was similar to that of carbohydrates, except that the former increased during the winter months while the latter decreased.

#### Nutrition.

(See also 2161, 2165.)

1386. HILL, H., AND OTHERS.  
The relation of foliage analysis to keeping quality of McIntosh and Spy varieties of apples.  
*Sci. Agric.*, 1950, 30: 518-34, bibl. 14, being *Contr. Div. Hort., exp. Fms Serv., Ottawa 741* and *Contr. Div. Chem., Sci. Serv., Dep. Agric. Ottawa 188*.



The N, P, K, and Mg content of the foliage, and the keeping quality of the apples, were determined in 30 McIntosh and 15 Spy apple orchards. Quality of McIntosh apples was reduced if the N level exceeded 2.0-2.1% of dry matter. Quality increased with K levels up to 1.7%. N:K ratios of less than 1:25 gave fruit of high quality. These relationships were not found with the Spy variety. Determinations were also made in an orchard with trees receiving varying amounts of ammonium sulphate and superphosphate. Progressive increments of ammonium sulphate led to a steady increase in foliage N and Mg and a decrease in foliage P and K, and was followed by a decrease in the fruit quality. In this trial both varieties showed the same critical foliage N level and the same N:K to quality relationship as had been shown in the other orchards for McIntosh alone. There was no relationship between superphosphate applications and foliage analysis, or between foliage P and storage quality.

C.W.S.H.

1387. HOWARD, J.

**Nitrogen foliage sprays [for apples].**

*Amer. Fruit Gr.*, 1951, 71: 2: 24, 43.

Nitrogen foliage sprays for apples have now found their way into commercial practice in the U.S.A. and several proprietary materials are available to the grower. Foliage sprays provide greater ease of N control than ground treatment and their application by conventional spray equipment is more economical. Two schedules are recommended according to the degree of fruit set desired in a particular variety and to the N-status of the tree. The initial work on this type of treatment was carried out at the New York Agricultural Experiment Station around 1940.

1388. MARIMPIETRI, L.

**Reazione, calcio e sviluppo dell'olivo.  
(Soil reaction, calcium and the development  
of the olive.)**

*Ital. agric.*, 1950, 87: 652-3.

Olives are usually considered to prefer soils containing calcium and with a subalkaline reaction, but they are found to grow well in regions with subacid or even acid soils. A trial is described using an acid soil (pH 5.2), treated with sulphuric acid (resulting reaction pH 4.1), calcium sulphate (pH 4.0) and calcium oxide (pH 6.8). The results, as shown by the weights of young plants, indicated that growth was depressed by sulphuric acid, but greatly increased by  $\text{CaSO}_4$  closely followed by  $\text{CaO}$ . It would seem, then, that available calcium rather than soil reaction is the important factor in inducing good growth.

1389. OZEROV, G. V.

**The salt resistance of olives. [Russian.]**  
*Doklady Akad. Nauk S.S.S.R.*, 1950, 72:  
409-12, bibl. 6, illus.

Experiments were carried out on olive seedlings to determine their salt resistance with reference to the possibility of growing olives in the valley of the river Atrek (Turkmen Republic). The conclusion drawn is that olives are relatively salt resistant plants, and that they can withstand a higher saline concentration when transplanted from a soil of moderate salt content than when transplanted from soil free of deleterious salts. By thus adapting them to withstand high salt concentrations, it should be possible to grow olives under

irrigation in the Atrek valley even on clayey soils with a high salt content.

**Spraying to thin or retain fruit.**

(See also 1293.)

1390. BATJER, L. P.

**Chemical thinning [of apples].**

*Amer. Fruit Gr.*, 1951, 71: 2: 25, 44-7.

The advantage of naphthaleneacetic acid over dinitro materials is that the hormone need not be applied until all danger of frost has passed and the actual fruit set can be assessed. In the U.S.A., dinitro compounds have given more reliable results in the northwest, while naphthaleneacetic acid has proved more satisfactory in certain midwest and eastern sections. The direct action of dinitro materials on the pollen and their indirect action on flowers already pollinated are briefly discussed.

1391. PHILLIPS, W. R., AND POAPST, P. A.

**Storage behaviour of McIntosh apples  
treated with a harvest application of sodium  
1-naphthaleneacetic acid.**

*A.R. Canada Dep. Agric. Fruit Veg. Prod.  
Res. Cttee*, 1949, 1950, pp. 9-10.

An experiment carried out at the Storage Laboratory, Ottawa, indicated that the use of a pre-harvest drop spray of App-L-Set, applied at a concentration of 5 oz. per 100 gal. water, had no serious deleterious effect on the storage behaviour of McIntosh apples provided the fruit was marketed before the end of the first week in January, as is generally recommended. There were, however, indications that the growth substance hastened maturity and ultimately produced excessive fungal wastage. There were also apparent differences in the degree of softness and acidity during the latter part of the test period.

1392. HARRIS, W. B.

**Growth responses with chloro-phenoxyacetic  
acids in Smyrna figs.**

*J. Aust. Inst. agric. Sci.*, 1950, 16: 71-2,  
bibl. 4.

From experiments carried out in South Australia it appears that certain of the chlorophenoxyacetic acids and also  $\beta$ -indolebutyric acid are able to stimulate very rapid growth in the syconium of the Smyrna fig and also produce changes in colour and texture similar to those normally occurring during ripening. [See also *H.A.*, 20: 1331.] At present the use of these materials is not considered to be practicable for the commercial production of parthenocarpic figs.

**Pruning.**

(See also 1320, 1399g, 2150.)

1393. LOEWEL, E. L.

**Hochstamm oder Niederstamm ? (Standard  
or half-standard ?)**

*Mitt. ObstbVersuchsrng Jork*, 1950, No.  
21/22, pp. 118-20, illus.

A discussion, supported by production figures and measurements, in favour of half-standards for apples.

1394. AUBERT, P.

**Taille des arbres hautes tiges. (Pruning  
standard trees.)**

*Fruit belge*, 1950, 18: 81-7, 101-8, bibl. 12,  
illus.

A review of methods of pruning standard fruit trees, with particular reference to practices in Switzerland, England, the U.S.A. and Canada.

### Packing.

(See also 1249.)

1395. LOEWEL, E. L., AND SCHEIL, W.  
Neue Verpackungs Vorschläge des Obstbauversuchsrings. (New packing suggestions from the Jork fruit growers' association.)  
*Mitt. Obstversuchsring Jork*, 1950, No. 23/24, pp. 134-9, illus.

An illustrated description is given of some new apple boxes of 6, 12.5 and 25 kg. capacity and of a small carton designed to hold 4 choice apples weighing about 1 lb.

1396. JUNE, R. I.  
Packing apples.  
*N.Z. J. Agric.*, 1950, 81: 553-7.

Detailed advice on apple packing is given, and the causes of loose packs are summarized.

### Storage.

(See also 1343, 1368, 1391, 1399a, 1440, 1462, 1467, 1540b, 2112, 2150, 2158, 2166, 2174.)

1397. KESSLER, H.  
Obstsortenproblem und Lagerungstechnik.  
(The fruit variety problem and storage technique.)  
*Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 7-9, 29-35, illus.

Apple production and storage developments in the most important fruit-producing countries are reviewed. In the United States the trend is to plant fewer varieties which mature late and can be stored successfully at low temperatures, while in England, though there is the same tendency to limit the number of varieties, they are usually medium late types such as Cox's Orange Pippin, Laxton's Superb, Worcester Pearmain and Bramley's Seedling, which require gas storage for successful keeping. The situation in Holland and Denmark is similar to that in England. With the exception of Reinette du Mans, France produces mainly early and medium late fruit. In Italy, particularly in the South Tyrol, the main crop is sold and exported before the winter sets in. In Switzerland, as in America, late maturing, low temperature resistant varieties, such as Glockenapfel, are of particular importance, and their merits and prospects on the world market are discussed.

1398. GRIFFITHS, D. G., AND POTTER, N. A.  
Effects of ethylene upon respiratory activity of apples in gas storage, with special reference to stage of maturity.  
*J. hort. Sci.*, 1950, 26: 1-7, bibl. 4.

King Edward VII apples were stored in an atmosphere containing 8% CO<sub>2</sub>+13% O<sub>2</sub>+79% N<sub>2</sub>, which was continually renewed at a rapid rate from a cylinder containing the synthetic gas mixture. The continuous addition of ethylene in concentrations between 20 and 500 p.p.m. had little effect upon the respiratory activity

when the apples were stored at 5° C. in the pre-climacteric state (gathered between 12 August and 18 October) and when the ethylene treatment was given in the first 5 weeks. The degree of variation in respiratory activity between 4 kg. samples in the artificial gas mixtures was much larger than the variation to be expected from our previous observations of respiratory activity in air. An explanation for this is suggested, and the bearing of the above observations on results previously reported is discussed. [Authors' summary.] —Low Temperature Research Station, Cambridge University.

### Noted.

1399. ————  
a BORGSTRÖM, G.  
Problem rörande järnvägstransport av frukt och grönsaker. (The transport of fruits and vegetables in refrigerated railway trucks.) [English summary 8 lines.]  
*J. roy. Swedish Acad. Agric.*, 1950, 89: 64-77, bibl. 51.  
In the United States, Canada and Europe.  
b BOWMAN, F. T.  
Advances in fruit-soil management.  
*J. Aust. Inst. agric. Sci.*, 1950, 16: 65-8.  
In Australia.  
c BROOKS, R. M., AND OLMO, H. P.  
1950's new fruit varieties [in U.S.A.].  
*Amer. Fruit Gr.*, 1951, 71: 1: 32, 65-6.  
Apple, stone fruit, small fruit, chestnut and lemon.  
d BROU, R.  
Des aptitudes, pour le pré-verger, de quelques variétés de pommiers. (Apple varieties suitable for grassed orchards.)  
*Rev. hort. suisse*, 1951, 54: 13-15, illus.  
e GAYFORD, G. W.  
Cultivation and "no cultivation" in orchards.  
*J. Dep. Agric., Vict.*, 1950, 48: 512-13.  
f GOUVERNEMENT GÉNÉRAL DE L'ALGÉRIE.  
Liste des meilleures variétés fruitières commerciales. (A list of standard and recommended fruit varieties for Algeria.)  
*Bull. Insp. gén. Dir. Agric. Algér.* 156, pp. 4 [undated, received 1950].  
g MONIN, A.  
La taille Lorette. (Lorette pruning.)  
*Fruit belge*, 1950, 18: 113-18.  
h MORETTINI, A.  
La coltura dell'olivo in Spagna. (Olive growing in Spain.)  
*Ital. agric.*, 1951, 88: 17-30, illus.  
i NEDERLANDSE ALGEMENE KEURINGSDIENST VOOR BOOMKWEKERIJGEWASSEN.  
Reglementen en voorschriften met betrekking tot de keuring van fruitgewassen en enkele laanbomen. (Regulations and instructions concerning the inspection of fruit plants and certain avenue trees.)  
[Publ.] N.A.K.B. Nederland, 2nd edition, 1950, pp. 92.



- j PICKETT, J. T.  
The fruit areas of America: California's central valley.  
*Amer. Fruit Gr.* 1950, 70: 12: 12-13, 22-3, illus.
- k POVOLOČKO, P. A.  
Olive propagation. [Russian.]  
*Sad i Ogorod* (Orchard and garden), 1950, No. 10, pp. 42-3.

- l RANDHAWA, G. S.  
Quince as a dwarfing rootstock for pear.  
*Indian J. Hort.*, 1950, 7: 2: 10-14, bibl. 11.
- m YOSHIDA, T.  
Chemical studies on the ether-soluble constituents of mulberry leaves. Part II. Chloroplast pigments. [Japanese, English summary.]  
*Bull. imp. sericult. Exp. Stat. Tokyo*, 1941, 10: 69-115, illus., from abstr. in *Jap. J. Bot.*, 1941, 11: (164)-(165) [received 1950].

## SMALL FRUITS, VINES AND NUTS.

### *Small fruits.*

(See also 1319, 1341, 1399c, 1434a, b, c, 1553, 1594, 1595, 1596, 1603c, d, 1612, 1951, 2007, 2009, 2126, 2148, 2157, 2158, 2160, 2167, 2174.)

1400. BLAIR, D. S., AND DAVIS, M. B.  
Bush fruits in eastern Canada.  
*Publ. Canada Dep. Agric.* 775, revised 1950, pp. 20, being *Fmrs' Bull.* 131.

First issued in 1945 [see *H.A.*, 16: 701], this revision contains additional information on varieties. Raspberries, blackberries, gooseberries, currants and boysenberries are dealt with.

1401. BAILEY, J. S., FRANKLIN, H. J., AND KELLEY, J. L.  
Blueberry culture in Massachusetts.  
*Bull. Mass. agric. Exp. Stat.* 358, revised 1950, pp. 24, bibl. 13, illus.

This bulletin was first issued in 1939 and revised in 1941 [see *H.A.*, 12: 830]. This new edition contains additional information on varieties, the manuring of cuttings and field plants, and on the blueberry stunt disease.

1402. MORROW, E. B., AND DARROW, G. M.  
The Murphy and Wolcott blueberry varieties.  
*Spec. Circ. N.C. agric. Exp. Stat.* 10, 1950, pp. 7, illus.

These two new varieties are introduced as early and second-early, canker-resistant varieties. In productivity and berry size they are comparable to the Weymouth variety. [See also *H.A.*, 20: 2394.]

1403. BELL, H. P.  
Determinate growth in the blueberry.  
*Canad. J. Res., Sect. C*, 1950, 28: 637-44, bibl. 4, illus.

Elongation of the vegetative branch of the blueberry ceases early in June owing to the death of both the apical meristem and the distal portion of the axis. Coincident with this is the development of a flowering branch primordium in the axil of the penultimate leaf. During July, the apical meristem of the flowering branch becomes inactive. It is either laterally displaced or it elongates as a minute unbranched columnar structure. Coincident with this inactivation, the proximal flower primordia develop florets in which all flower parts may be recognized, but the distal flower primordia, that is those adjacent to the inactivated apical meristem, are retarded in their development. The retarded distal flower primordia are developed in

acropetal succession, but the proximal flower primordia do not exhibit acropetal succession. All the stages are illustrated by line diagrams. [Author's abstract.]—Dalhousie Univ., Halifax, N.S.

1404. MIKOLAIČUK, I. A.  
Propagation from young currant bushes. [Russian.]  
*Sad i Ogorod* (Orchard and garden), 1950, No. 10, p. 39.

A brief account is given of an experiment showing that black currants propagated from mature plants come into bearing sooner than those grown from cuttings taken from young, non-bearing plants.

1405. WOOD, C. A.  
Raspberries in Scotland.  
*Fruitgrower*, 1950, No. 2870, pp. 846-7.

The article describes the progress of variety trials now being carried out in the raspberry-growing area of Angus and East Perthshire. In one trial Malling Landmark, M. Promise and Lloyd George gave the heaviest crops over a 3-year period, while in another trial in its first year Lloyd George (New Zealand stock), M. Promise and Seedling W(51/57) gave the highest yields. An evaluation of the canning and quick-freezing qualities of the varieties was also made.

1406. RAMIG, R. E., AND VANDECAVEYE, S. C.  
A study of certain nutrient levels for raspberries grown in water cultures.  
*Plant Physiol.*, 1950, 25: 617-29, bibl. 14, illus., being *Sci. Pap. Wash. St. agric. Exp. Stats.* 861.

Red raspberries of the Washington variety were grown in nutrient solutions containing four levels of nitrogen, phosphorus, potassium, and calcium. During the growing period distinct foliar deficiency symptoms were displayed by the plants in the two lowest concentration levels of each nutrient element, and these are described with the aid of photographs of leaves and plants. Leaf samples of the first six physiologically mature leaves were taken from all plants in a series when the growth of plants at the third concentration level of the nutrient under study began to be limited. The leaf blades and petioles were analysed separately. The results of these studies indicate that the analysis of leaf petioles better reflected the P, K, and Ca status of the raspberry plant than the analysis of the leaf blades, whereas blade analysis was preferable in determining the N and Mg status of the plant. Expressed in terms of the dry weight of plant material and

under the conditions of the experiments, critical levels of various nutrients were tentatively established. The value for total N in raspberry leaf blades is approximately 2.9%. The value for total P in petioles or blades is approximately 0.3%, that for total K in the petioles approximately 0.7%, and that for total Ca in the petioles approximately 0.2%.

1407. LEE, F. A., AND OTHERS.

**Low temperature preservation of fruit juices and fruit juice concentrates.**

*Bull. N.Y. St. agric. Exp. Stat.* 743, 1950, pp. 18, bibl. 6.

Contains information on the flavour, colour and ascorbic acid content of fruit juice preparations from certain varieties of raspberries and strawberries and from Montmorency cherry and Italian prune.

1408. (DAVIS, M. B., AND BLAIR, D. S.)

**Strawberry growing.**

*Publ. Canada Dep. Agric.* 838, 1950, pp. 14, illus., being *Circ.* 184.

Adapted from *Publ.* 621, "The strawberry and its cultivation in Canada" [see *H.A.*, 15: 1504].

1409. OLDHAM, C. H.

**Early strawberries under cloches.**

*Agriculture, Lond.*, 1950, 57: 429-32.

An account is given of types of cloche, strawberry varieties for early production, propagation, soil types and preparation, planting and cultivation.—N.A.A.S.

1410. ROGERS, W. S., AND MODLBOWSKA, I.

**Strawberry cultivation studies. III. Spaced and matted systems.**

*J. hort. Sci.*, 1950, 26: 47-59, bibl. 10, illus.

A series of experiments on planting systems for strawberries was carried out at East Malling Research Station from 1935 onwards. The first 3 trials are reported here. I. *The effect of distance of planting in the single plant systems.* Royal Sovereign strawberries were planted in rows 36 in. apart. Distances in the rows of 9 in., 18 in. and 36 in. were compared. The 36 in. spacing resulted in considerable crop reduction, compared with the normal 18 in. spacing, in both a wet and dry season, while the 9 in. spacing resulted in a considerable increase in a dry season. Although an 18 in. spacing is considered desirable for experimental plots, it is concluded that where maximum crops are required close spacing is clearly justified. II. *Single plant and matted systems.* A spaced single plant system and 3 matted systems (matted row, matted bed and spaced matted bed), all originally planted at 18×36 in., were compared. In both a wet and a dry year matted rows gave a 40-80% increase in crop, and matted beds up to 100% increase, compared with single spaced rows. There were no significant differences either in percentage of large fruits or percentage of rotten fruits between the matted systems and the single plant system. III. *Comparison of six systems.* In every case matted systems gave larger crops than the spaced single plant row, the increases being 43-52% for the matted rows and 65-91% for the matted beds. The triple row system (the first runner from each plant being laid in the middle of alternate alleys) gave a 56% increase but required more labour than the matted row. The spaced matted systems gave larger crops and a higher percentage of Grade I fruits than the unspaced

ones, although even in the latter the total amount of Grade I fruits was higher than in the single plant rows. It is concluded that, given good weed control, matted rows are desirable for commercial culture, but that matted beds, 36 in. wide, run the risk of serious drought damage.

1411. ŠAŠKINA, L. M.

**Cross pollination in strawberries.** [Russian.]

*Agrobiologija* (Agrobiology), 1950, No. 5, pp. 45-7.

The polygamous condition in varieties of the garden strawberry is discussed in relation to cross-pollination. Results are tabulated of crossing a number of varieties, showing percentage set, average weight of berries, and density of their ripe fruit as indicated refractometrically.

*Vines.*

(See also 1280, 1333, 1434a, 2158, 2166, 2170, 2174.)

1412. POGOSIAN, S. A.

**The development of the seedlings of self-rooted varieties of vine and their hybrids.** [Russian.]

*Agrobiologija* (Agrobiology), 1950, No. 3, pp. 87-103, bibl. 6, illus.

The seedlings of self-rooted varieties of vine develop, as a rule, like the cultivated varieties. When grown from seeds derived from open pollination they show a diversity of forms, from those similar to the parent to others which are quite different. The first generation hybrid seedlings from crossings of self-rooted varieties show great differences. When young hybrid seedlings are grafted on local varieties they often show a tendency to resemble those varieties in form, size and colour of fruit, seeds, etc.

1413. PIROVANO, A., AND COSMO, I.

Gli incroci pirovano nell'isola di Rodi: osservazioni e rilievi dell'annata 1949.

(Pirovana hybrids in the isle of Rhodes: observations and remarks for the year 1949.)

[English summary 7 lines.]

*Ann. Sper. agrar.*, 1950, 4: 975-1005, illus.

Observations are given on some 300 Pirovana hybrids (obtained from crossing the best varieties of Italian and foreign table grapes) which were planted at Paradisi in the Isle of Rhodes to ascertain their behaviour in a hot arid climate. The most promising hybrids are indicated.

1414. POTAPENKO, JA. I., AND ZAHAROVA, E. I.

**Frost resistant vine varieties.** [Russian.]

*Sad i Ogorod* (Orchard and garden), 1950, No. 10, pp. 49-54, illus.

Varieties Northern (No. 7) and Glow of the North (No. 5) are two selections from crossings between the European table variety Malenger's Seedling and the Amur vine. Among the various good characteristics observed in these two varieties, frost resistance is the most important. They have a shorter growing period than the earliest European varieties, and in the Rostov region they begin to ripen in the middle of July. During the winter of 1948/49 when temperatures went down to -24°-8° C., none of the buds of the uncovered hybrids was killed, while 35-45% of the buds of the protected European varieties and 100% of unprotected ones died.



The fully ripe grapes contain 25-27% sugar and 4.0-6.5% acid, and are suitable for making high quality wine.

1415. MANOHIN, P. A.

**To improve the quality of cuttings.** [Russian.]

*Vinodelie i Vinogradarstvo* (Wine-making and Viticulture), 1950, No. 11, pp. 45-9, illus.

In trials for improving the stand of vine cuttings it was found that, the thicker the cuttings, the better developed were the main roots and shoots growing from them, and also that cuttings from ringed stems made better growth than those from unringed stems. Cuttings prepared from stems immediately after they were taken from the plant and kept in a cellar on damp sand gave the best results.

1416. CORNU, T.

**Méthode de Geisenheim de greffe de la vigne ou méthode des cartons du Professeur Birk.** (The Geisenheim or Professor Birk's carton method of grafting the vine.)

*Progr. agric. vitic.*, 1951, 135: 40-2.

In the method described the grafted cuttings are not planted in the nursery in the usual way, but are inserted, with the scions projecting, in prepared soil in cardboard cylinders 30 cm. by 4 cm. with holes 1 cm. in diameter and 1.5 cm. apart, the bottom being perforated by holes 2 mm. in diameter. The cartons are then well watered and put side by side in a warm bed under glass, where they remain until they are ready to be planted in the vineyard, about the end of May or beginning of June.

1417. KOLESNIK, L. V.

**The effect of boron on grafted vines during stratification and hardening-off.** [Russian.] *Doklady vsesojuz. Akad. sel'sk. Nauk*, 1950, 15: 11: 17-22, bibl. 2, illus.

Borax at the rate of 10 mg. per kilo of soil in the stratification boxes has a positive effect on callus formation, differentiation of the intermediate cambium and vessels, and root production during stratification and hardening-off of grafted vines. After planting in the nursery the effect of the boron treatment is a more vigorous root development by the rootstock. Boron assists the union of stock and scion as shown by improved growth in the nursery and the greater number of successes and higher quality of the young vines. The boron treatment prevents the development of necrosis in the rootstocks.

1418. QUINN, D. G.

**Manuring the grape vine.**

*J. Dep. Agric. Vict.*, 1950, 48: 535-8, illus.

From the trials described it would appear that for table grapes under irrigation, as with wine grapes on dry land, fertilizers have no great influence on yield or growth. The programme for these irrigated areas is best aimed at preserving soil fertility by the use of green manures.

1419. KELAREV, M. P.

**The restoration of ground that has been eroded.** [Russian.]

*Vinodelie i Vinogradarstvo* (Wine-making and Viticulture), 1950, No. 11, pp. 51-2.

Bringing woodland soil into eroded vineyards assists the accumulation of water in winter and reduces evaporation in summer, thus improving the physiological and microbiological condition of the ground and enriching it with nutrient substances. Staggered hedges on the slopes assist in retaining the soil.

1420. ŽURIN, A. B.

**Irrigation of vineyards.** [Russian.]

*Sad i Ogorod* (Orchard and garden), 1950, No. 10, pp. 44-6.

In regions of U.S.S.R. such as Azerbaijan and Armenia in central Asia and some southern parts of European Russia ideal vine-growing conditions exist except for inadequate moisture. Irrigation by furrows is recommended for these districts, and the soil types, topography, climate and other factors influencing the size and number of furrows, quantity of water and time of application are discussed.

1421. COOMBE, B. G.

**Artificial parthenocarp in grape vines.**

*J. Aust. Inst. agric. Sci.*, 1950, 16: 69-70, illus.

In trials on young uncinctured currants and Grenache grapes during the 1949/50 season in South Australia, 11 growth substances were used singly and in certain combinations, making 17 treatments in all. No treatment had any effect on setting of Grenache, all bunches being uniformly poor. On currants the use of parachlorophenoxyacetic acid at 50 p.p.m. appeared to be the most effective. It seems that 2,4-D is toxic to grape vines at 5 p.p.m.

1422. BUZIN, N. P.

**Altering the fertility of vine stems.** [Russian.]

*Agrobiologija* (Agrobiology), 1950, No. 3, pp. 104-8, illus.

Data obtained indicate that merely pinching back shoots at the proper time produces conditions favourable for the development of the reproductive organs and so increases yield.

1423. KONDO, I. N.

**The role of the lateral shoots in hastening the restoration of vines.** [Russian.]

*Agrobiologija* (Agrobiology), 1950, No. 3, pp. 109-17.

Great damage was caused during the severe winter of 1948/49 in the vineyards of middle Asia, and measures for restoring the productivity of the vines are here considered. The favourable effect of cutting back early the long vine stems is shown in the increased yield on the lateral shoots. Different varieties, however, do not always show the same degree of response to the operation.

1424. MORETTI, A.

**Una pratica viticola non sempre utile. (A viticultural practice that is not always beneficial.)**

*Humus*, 1950, 6: 8: 27-9, illus.

A method, commonly practised by viticulturists in Italy to hasten maturation of the fruit and to increase the glucose content, is to cut the stalks of the bunches of grapes at their base and leave the clusters hanging there for a few days, to ripen off. An examination of

the sugar content of the fruit submitted to this operation and of fruit not so treated showed, however, that the cutting does not always have the desired effect, and that, in an unfavourable year, like 1948, harvesting the fruit should not be hastened but retarded as much as possible.

1425. BENVENIGNI, L.

De l'influence du prélèvement de raisin de table sur la qualité du moût. (The influence of selective picking of grapes for table on the must quality of the remaining crop.)

*Rev. romande Agric. Vitic.*, 1951, 7: 7-8.

In French-speaking Switzerland it is customary to select and sell separately the bunches of table-grape quality and to use the remainder for wine-making. This selective picking may take place in two stages or in one operation. In order to test the effect of selective harvesting on must quality, three treatments were compared at Pully, Lausanne, on a plot of 95 Chasselas vines. The tabulated data, representing the results of the 1950 trials, show that the pre-picking of table grapes (about a fortnight before the main harvest) improves must quality.

*Nuts.*

(See also 1399c, 1434d, e, 2007, 2175.)

1426. DE ROSA, M.

Il nocciolo nell'Avellinese. (The hazel nut around Avellino.)

*Ital. agric.*, 1950, 87: 700-6, illus.

An account of hazel nut (*Corylus avellana*) growing in the Avellino region of Italy, with notes on types of soils, cultivation, yields, varieties, and storage.

1427. HARRIS, H.

Preservation of shelled pecans by drying and hermetically sealing.

*Proc. 39th annu. Conv. north. Nut Grs' Ass.* 1948, Norris, Tenn., pp. 169-73., bibl. 14 [received 1951].

Experiments at the Alabama Agricultural Experiment Station have shown that pecan kernels can be kept for 9 years by drying them to about 2% moisture content and storing them in sealed containers. The best results were obtained by drying the kernels in an oven for about 50 min. at 200° F.

1428. CLARKE, W. S., Jr.

Nut investigations at the Pennsylvania State College.

*Proc. 39th annu. Conv. north. Nut Grs' Ass.* 1948, Norris, Tenn., pp. 148-9 [received 1951].

Black walnut seed collected from fence-row trees and planted out in the ground the same autumn gave good germination, while those stored in a box in soil along with some hickory and pecan nuts did not grow at all. Serious damage was inflicted on Persian, Chinese and black walnuts, Chinese chestnuts, golden chinkapin (*Castanopsis*) and filberts by sudden frosts in late September 1947 and the severe winter that followed.

1429. LUGEON, A.

Contribution au greffage du noyer. (A contribution to the grafting of walnuts.)

*Rev. hort. suisse*, 1951, 24: 41-2, illus.

In many instances the propagation of valuable old walnut trees growing in fields may be desirable, although no annual shoots are available as scion wood. In the author's experiments, carried out in collaboration with the nursery of the Association forestière vaudoise, grafting with 2- to 3-year-old wood gave 85-90% success. The pith of the branches selected as scions should preferably be small.

1430. SHESSLER, S.

Grafting walnuts in Ohio.

*Proc. 39th annu. Conv. north. Nut Grs' Ass.* 1948, Norris, Tenn., pp. 145-6 [received 1951].

The method of grafting described is carried out when the rootstock, preferably  $\frac{3}{4}$ -1 in. in diameter, is in full leaf. The scion is cut with about 4 in. of 2-year-old wood at the base and some 1-year-old wood with small matured buds, and is kept in damp sawdust till required. The slot bark method is used; the stock is cut straight across and the scion is introduced with the lowest bud just above the bark. The bark of the scion is roughened and a small nail is used to hold it in position. Cord may be used for tying, but when the bark of the stock is thick this is unnecessary. A paper bag is tied over the graft till the scion starts to grow. Only one scion is inserted in each stock, wax is used plentifully but never on the buds.

1431. SLATE, G. L.

Grafting walnuts in the greenhouse.

*Proc. 39th annu. Conv. north. Nut Grs' Ass.* 1948, Norris, Tenn., pp. 146-7, bibl. 1 [received 1951].

The method described is based on that used at East Malling. The rootstocks, 2-year-old black walnut seedlings, are dug in the autumn and stored in the cellar until late February or early March when they are potted in 6- or 8-in. pots. The stem is cut back to 8 in., the pots are placed in a warm house and watered and in about 10 days' time the buds begin to break. The Jones modified cleft graft is used. The stub is cut back at grafting time and the cleft is made by cutting, not splitting, the stock with a large grafting knife. The scion is tied in place with  $\frac{1}{2}$ -in. nursery tape and painted with grafting wax. The pot is then set in a propagating frame about 18 in. deep, with bottom heat, where high humidity and a temperature of over 80° F. is maintained until shoots from the scion are 2-3 in. long. The first year's growth is not over 8-10 in., but in the second year the walnuts grow to 3-4 feet.

1432. WESCHCKE, C.

The importance of stock and scion relationship in hickory and walnut.

*Proc. 39th annu. Conv. north. Nut Grs' Ass.* 1948, Norris, Tenn., pp. 190-5 [received 1951].

The Weschcke shagbark hickory (*Carya ovata*) grows much more slowly than such varieties as Bridgewater, Siers, Deveaux, Laney and many others. When grafted on bitternut hickory (*C. cordiformis*) it grew well and showed apparent compatibility, though it did not bear properly until cross-pollinated. When the more vigorous varieties were grafted on bitternut hickory they outgrew the rootstock and did not produce any nuts, with the exception of Bridgewater,



which was also found to be a very good pollinator for the Weschcke. It would appear that the rootstocks used should be at least as vigorous as the scion variety. The northern pecan seedlings, being much faster growers than bittersweet and shagbarks, would therefore seem to be suitable rootstocks for almost any variety of hickory. Varieties of black walnut (*Juglans nigra*) grafted on wild native butternut (*J. cinerea*) also showed incompatibility by outgrowing the rootstock and remained barren.

1433. HENDRICKSON, A. H., AND VEIHMAYER, F. J.  
Growth of walnut trees as affected by irrigation and nitrogen deficiency.

*Plant Physiol.*, 1950, 25: 567-72, bibl. 9.

The question of whether plants grow equally well throughout the entire range of soil moisture from field capacity to permanent wilting percentage is a controversial one. A field irrigation experiment with walnuts, carried out at the University of California, Davis, over a period of 12 years, gave some interesting evidence on the problem. No fertilizers were applied during the experiment. Two irrigation treatments were given in randomized plots; in one the trees were irrigated only sufficiently to keep the upper 6 feet of soil above the permanent wilting percentage, and in the other sufficiently to keep the soil at a relatively high moisture level. The average cross-section area of the trunks and the cumulative yields of trees kept at the low moisture level increased more rapidly than those of trees kept at the high moisture level. Leaf analysis indicated that this difference was due to an inadequate supply of N in the high moisture level plots. It is concluded that the greatest growth does not result from maintaining the moisture level high in the available range, and that in experiments to measure growth

responses nutritional factors must be considered in addition to soil-moisture content.

### Noted.

1434.

- a BITTNER, C. S., NICHOLS, L. P., AND OTHERS.  
Growing small fruits for home use.  
*Circ. Pa agric. Ext. Serv.* 368, 1950, pp. 12.  
Strawberries, red and black raspberries, grapes, currants and gooseberries.
- b (BLAIR, D. S.)  
Raspberries and blackberries.  
*Publ. Canada Dep. Agric.* 836, 1950, pp. 11, being *Circ.* 183.  
Adapted from *Publ.* 775, "Bush fruits" [see *H.A.*, 16: 701].
- c (BLAIR, D. S.)  
Gooseberry culture.  
*Publ. Canada Dep. Agric.* 839, 1950, pp. 7, illus., being *Circ.* 185.  
Adapted from *Publ.* 775, "Bush fruits" [see *H.A.*, 16: 701].
- d CROSS, F. B.  
Pecan selection in Oklahoma.  
*Proc. 39th annu. Conv. north. Nut Grs' Ass.* 1948, Norris, Tenn., pp. 160-4 [received 1951].
- e SENN, T. L.  
Pecan production in South Carolina.  
*Proc. 39th annu. Conv. north. Nut Grs' Ass.* 1948, Norris, Tenn., pp. 167-9, bibl. 2 [received 1951].

## PLANT PROTECTION OF DECIDUOUS FRUITS.

### General.

(See also 1399i, 2134.)

1435. GOIDANICH, G.  
Chimica e meccanica a difesa delle colture e dei prodotti agricoli negli Stati Uniti d'America. (The chemistry and mechanics of the protection of plants and of agricultural products in the U.S.A.)  
Reprinted from *Ric. sci.*, 1950, 20, No. 8-9, as [Publ.] *Lab. sper. Patol. veg. Bologna*, 1950, pp. 74, illus.

A review discussing fungicides, insecticides, combined preparations, stickers, wetters, etc., repellants, baits, fumigants, herbicides, and machinery for applying the preparations.

1436. GRISON, P., AND PORTIER, G.  
La lutte contre les ennemis du pommier à cidre en Normandie. (Control of cider apple parasites in Normandy.)  
*Rev. hort. Paris*, 1950, 122: 218-21, bibl. 10, illus.

Of the parasites of cider orchards, those affecting the development of the trees and the weight of crop, such as leaf-eating caterpillars, apple-blossom weevil, brown rot, mosses and lichens, are of more importance than

those affecting the quality of the fruit. As the value of the fruit is low, spray treatments must be kept to a minimum. The biology of the more important pests is considered and a spray programme suggested.

1437. DU PLESSIS, S. J.  
Noteworthy vine diseases abroad.  
*Fmg S. Afr.*, 1950, 25: 322-8, illus.

Pierce's disease, roncet or nettle-leaf, white mosaic or panachure, true mosaic, witches' broom, distortion, leaf roll and hormone injury are discussed with the aid of illustrations. None of these diseases, nor even downy mildew, has made its appearance in South African vineyards.

### Disturbances of nutrition or of unknown origin.

(See also 1256, 1313, 1368, 1383, 1417.)

1438. FRITZSCHE, R., AND STOLL, K.  
Einige Bemerkungen zur Korkkrankheit an Äpfeln. (Notes on the internal cork disease of apples.)  
*Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 3-7, illus.

During 1950 a large number of apples examined at Wädenswil were found to suffer from internal cork disease, due to boron deficiency. Internal cork, found

in the variety Glockenapfel in 1948-49, was dealt with at some length in an earlier communication [see *H.A.*, 20: 666]. Recommendations for the control of the disorder include a soil dressing of borax at the rate of 10 g. per sq. m. under the crown of the tree, or two sprays containing 200 g. of boric acid in 100 l. of water. A simple process for ascertaining the boron content of the soil by a sunflower test method is described. Lime should not be applied to boron deficient soils.

1439. WADE, G. C.

**Manganese deficiency of apples.**

*Tasm. J. Agric.*, 1950, 21: 323-4, bibl. 1, illus.

A disorder of the foliage of fruit trees in Tasmania is due to manganese deficiency. The chief symptom is a paling of the leaf colour between the main veins, and the foliage is frequently sparser than on healthy trees. The disorder can be controlled rapidly by spraying with 4 lb. of manganese and 4 lb. of sodium carbonate to 40 gal. water.

1440. CARNE, W. M.

**Brown heart of apples and its relation to our knowledge of apples and of ship carriage of perishable foods.**

*J. Aust. Inst. agric. Sci.*, 1950, 16: 59-64, bibl. 9.

A review is given of work initiated by the appearance of brown heart in Australian apples imported into England in 1920, which eventually led not only to its control, but also to studies of the fundamental physiology of apples, the classification, study and control of various non-parasitic disorders of apples, pears and other fruits, and better storage methods.

1441. RUI, D., AND ROSTIROLA, G.

**Deperimento e moria dei peschi. (The withering and death of peaches.)**

*Ital. agric.*, 1950, 87: 740-7, bibl. 4, illus.

A disease of peach trees responsible for severe losses in Italy is referred to as leptonecrosis, and described with a list of susceptible varieties. The cause is at present unknown, but precautionary measures are advised, such as the removal of affected trees, the disinfection of pruning and grafting tools, and the planting of resistant varieties.

*Climatic factors.*

(See also 1540y.)

1442. BLUVŠTEIN, I. N.

**The influence of white-washing on the frost resistance of vine buds. [Russian.]**

*Sad i Ogorod* (Orchard and garden), 1950, No. 10, pp. 56-7.

In the Crimea, buds of unprotected vines are often injured in the winter and early spring when a thaw is followed by frost. An experiment described shows that this injury can be largely avoided by lime-washing the vine stems.

1443. KIZJURIN, A. D.

**Protection of fruit trees from winter "burn". [Russian.]**

*Sad i Ogorod* (Orchard and garden), 1950, No. 10, pp. 19-23, illus.

In central Russia and in Siberia fruit trees are often

severely damaged, and sometimes killed, in the winter and spring as the result of differences in the temperature of the cambium on the north and south side of the trunks. The damage sustained is particularly heavy in the early spring when the heat of the day stimulates the rise of sap, thus making the bark more susceptible to the effect of frost at night. Recommended control measures include earthing up of low bushes, whitewashing the stems and branches of older trees and wrapping old paper, dry grass, maize leaves, bast, etc., around the stem and lower branches of young trees.

1444. MACDANIELS, L. H., AND BOYNTON, D.  
**Winter injury to nut trees at Ithaca, New York, in the fall and winter of 1947-48.**

*Proc. 39th annu. Conv. north. Nut Grs' Ass.* 1948, Norris, Tenn., pp. 199-201 [received 1951].

Frost injuries sustained by several nut species are briefly described. Apparently the damage was due to sudden autumn frosts occurring before the abscission layers had formed in the leaf bases, followed by sub-zero temperatures in mid-winter.

1445. POMARANOV, S. F.

**Forest and orchard. [Russian.]**

*Sad i Ogorod* (Orchard and garden), 1950, No. 12, pp. 12-18, illus.

Observations made and measurements taken at the Rabotkin Agricultural Technicum, Gorky region, and in various other parts of central Russia have shown that fruit trees sheltered by forests grow and develop better, produce higher yields, are more frost-resistant and bear earlier than those grown unprotected.

1446. SANNIKOV, V. S.

**The influence of shelter belts on the growth and yield of plums. [Russian.]**

*Sad i Ogorod* (Orchard and garden), 1950, No. 12, pp. 18-21, illus.

The success of commercial fruit growing in the steppe regions of the southern Urals depends largely on the protection of plantations from drying winds. Three types of shelter belt are recommended: (1) 7 rows wide around the whole plantation area, (2) 5 rows wide across the middle of the area, and (3) a double row around blocks of 2 ha. of plums. To improve further the water economy of the soil, watering at the end of May or early June is suggested, and also mulching in the early spring followed by removal of the mulch in July to encourage hardening off.

1447. GUKASJAN, A. S.

**Methods of covering up figs, and dates for uncovering them in the spring. [Russian.]**

*Sad i Ogorod* (Orchard and garden), 1950, No. 10, pp. 40-1.

In southern Kazakhstan, frost protection of figs is carried out by tying the bush up with willow wands and burying the branches in trenches 50-60 cm. wide and 25-30 cm. deep. The buried part is protected by a layer of reeds, potato haulms or straw and covered with a layer of soil 35-40 cm. deep. The date of uncovering is of great importance, the second half of March being most suitable for this region.



1448. BÖMEKE, H.  
Brennflecken auf Apfelblättern. (Leaf burn on apples.)

Mitt. ObstbVersuchsring Jork, 1950, No. 21/22, pp. 123-4, illus.

An illustrated description is given of spots observed on the leaves of Cox's Orange Pippin, resembling spray or insect damage, which are thought to be caused by rain drops acting as small lenses in bright sunshine.

### Viruses.

(See also 2132.)

1449. LINDNER, R. C., KIRKPATRICK, H. C., AND WEEKS, T. E.

A simple staining technique for detecting virus disease in some woody plants.

Science, 1950, 112: 119-20, bibl. 2, illus.

A staining procedure is described which consists of removing the chlorophyll from leaves, fixing the polyphenols, and developing blue-coloured polyphenol compounds by treatment with NaOH. The method proved applicable to plants having a polyphenol system, and good staining reactions were obtained with apricots, cherries, peaches, plums, apples, pears, strawberry, rose, and high bush cranberry; negative results were obtained with viruliferous herbaceous plants other than strawberry. Plants showing genetic variegations or chemical injuries resembling virus symptoms gave no stain reaction. Possible mechanisms are suggested to explain the accumulation of polyphenols in virus-affected tissue.

1450. MARCHIONATTO, J. B.

El vivero como fuente de propagación de enfermedades de virus. (Propagation of virus diseases in the nursery.)

Rev. argent. Agron. B. Aires, 1950, 17: 249-51, bibl. 4.

As no precautions are taken by nurserymen in Argentina to select healthy material for grafting, propagation is one of the chief means by which virus diseases of fruit trees are spread. The diseases most commonly propagated in the nursery are apple mosaic, plum mosaic and root rot, and psorosis of citrus. The author advocates the introduction of an inspection and certification scheme such as is practised in England and the U.S.A.

1451. RUI, D.

Una malattia inedita: la virosi a scopazzi del melo. (A new disease: the witches' broom virus disease of apple.)

Humus, 1950, 6: 11: 7-10, illus.

The distribution in Italy of a witches' broom disease of apple trees is given. The symptoms are numerous slender branches bearing small, irregular, yellowish leaves. The variety Welfort Park is particularly affected; less susceptible are Morgenduft and Jonathan, while other varieties are mentioned which are free from disease in the orchard but can be infected by grafting. As it is transmitted by grafting, it is considered to be a virus disease. Control measures recommended are (1) the selection of varieties that hitherto have seemed immune, (2) the selection of healthy scions for grafting, (3) the disinfection of tools used for pruning and grafting, (4) the immediate removal of diseased trees

and the disinfection of the holes with iron sulphate or quicklime.

1452. PRENTICE, I. W.

Rubus stunt: a virus disease.

J. hort. Sci., 1950, 26: 35-42, bibl. 8, illus.

Rubus stunt is a disease of loganberry and blackberry prevalent in southern England. It also affects raspberry and other cultivated species and hybrids of *Rubus*. Infection in all hosts results in the production of very numerous weak canes, so that the infected plant has a bushy appearance. The disease, which spreads rapidly in loganberry and less rapidly in raspberry, is transmissible by grafting and is considered to be a virus disease. The vector is not known. Control by roguing is recommended. Rubus stunt is considered distinct from any virus disease of *Rubus* so far described, with the possible exception of a dwarfing disease of brambles reported from California. [Author's summary.]—East Malling Res. Stat., Kent.

1453. BERKELEY, G. H.

Mild rugose mosaic of sweet cherry.

Phytopathology, 1950, 40: 992-8, bibl. 4, illus., being Contr. Div. Bot. Plant Path., Sci. Serv., Dep. Agric. Ottawa 1005.

A mild-rugose-type mosaic virosis, found originally on two Black Tartarian sweet cherry trees, has been transferred by budding to varieties of peach, plum, and cherry. On Black Tartarian and Napoleon sweet cherries, the outstanding symptoms were distortion, stunting, and chlorotic mottling of the unfolding leaves each year. Chlorosis occurred as spots, rings, bands, and patterns. A low percentage of later-formed leaves showed chlorosis of a milder type. There was considerable variation in symptoms on individual leaves. On peaches, there was delayed foliation and spot mottling of foliage with mild bark roughening and splitting, especially on Elberta and Rochester varieties. Symptoms on Montmorency sour cherry comprised delay in foliation, distortion of unfolding leaves, and chlorotic spots, rings, and bands. Inoculations on Italian prune and Lombard plum gave no discernible symptoms. Mild rugose mosaic is considered to be an undescribed disease, since its symptoms on the above hosts do not agree in all respects with those of any known virus diseases. [Author's summary.]

1454. ENDÔ, Y.

Researches on the mulberry virosis II. [Japanese, English summary.]

Bull. Sericult. Silk-Industr., 1939, 11: 203-18, illus., from abstr. in Jap. J. Bot., 1940, 11: (4) [received 1950].

It was shown that expressed juice from the leaves of virus-infected mulberry trees has the property of decolouring methylene blue stain. By making use of this property it was proved that the virus can be transmitted by grafting and it can remain alive in desiccated leaves for as long as 9 years. Observations were made on the malformation of seedlings grown from infected seed.

1455. NICOLINI, J. C., AND TRAVERSI, B. A.

Observaciones sobre una nueva enfermedad del olivo en la Argentina. (Observations on a new disease of olives in Argentina.)

Idia, 1950, 3: 32: 8-11, bibl. 14, illus.

A disease of olives, known as "partial paralysis", was first noticed in Argentina in 1946 and is rapidly spreading through many olive-growing districts of that country. The macroscopic and microscopic symptoms are described in detail. The disease first shows itself in a yellowing and curling of the leaves on secondary branches. These become dry and remain on the branch, while infection spreads progressively backwards and finally results in the death of the tree. Many leaves, especially on the young shoots, develop mosaic symptoms. When infected wood is cut it smells musty or rancid. The expression of symptoms is very variable and depends on the vegetative condition of the trees and on climatic factors. Microscopic examination revealed a degeneration of the phloem and a disorganization of the cambium of infected wood. The disease was transmitted successfully to *Ligustrum sinense* by inoculation, which suggests that it is of virus origin. The nature of similar diseases in other parts of the world is discussed.

1456. VITORIA, E. R., AND ALCALDE LASSALLE, A. J.  
El "arrugamiento viroso" de la vid.  
(Virus crinkle [Pierce's disease] of grape vines.)  
*Rev. Invest. agric. B. Aires*, 1949, 3: 1-26, bibl. 20, illus. [received 1951].

As a result of 8 years' study at the Phytopathological Laboratory, Mendoza, of a serious disease of vines found in San Juan and Mendoza, Argentina, the authors present a preliminary report on its history, host plants, distribution, economic importance, symptoms, causes and control. The disease is identified with Pierce's disease, but the name "arrugamiento viroso" [virus crinkle] is suggested as preferable. It was established that the disease was caused by a virus, which is not soil-borne, but which is spread by propagation of the plants, pruning, and possibly by insect vectors. Observations are recorded on the resistance or susceptibility of 19 varieties. Suggested control measures are: (1) adequate legislation (specified in an appendix), (2) removal of infected plants, (3) the use of only healthy material for planting, (4) frequent disinfection of the grafting and pruning knife, (5) the use of resistant varieties, (6) isolation from fields of alfalfa, (7) proper manuring, and (8) control of insects.

### Bacteria.

(See also 1370.)

1457. HORNBOSTEL, W.  
Beitrag zur Frage der Wurzelkropfbekämpfung. (Crown gall control.)  
*Z. PflKrankh.*, 1948, 55: 69-75, bibl. 2 [received 1951].

Earlier observations had suggested that to allow a short time to elapse before planting, to let a protective layer develop over cut surfaces after trimming the roots of young nursery trees, lessens the chances of infection by the crown-gall organism, *Pseudomonas tumefaciens*. This was confirmed in trials with some 1,200 apple and pear wildings. The incidence of infection of the stem at ground level was reduced to nil when the trees were kept in dry soil at 15° C. for 19 days before planting in the nursery.

1458. PEASE, R. W.  
Production of bacteria-free walnut kernels.  
*Proc. 39th annu. Conv. north. Nut Grs' Ass.* 1948, Norris, Tenn., pp. 157-60 [received 1951].

To kill *Bacillus coli*, spread mainly by rats and mice while the nuts are drying, walnut kernels were pasteurized at the West Virginia University in a specially constructed machine at a temperature of 180° F. and humidity of 70% for 30 min. Under these conditions the bacteria were destroyed without imparting a cooked flavour to the kernels.

### Fungi.

(See also 1526, 1527, 2166.)

1459. COMMONWEALTH MYCOLOGICAL INSTITUTE.  
*Distribution maps of plant diseases.*  
Commonwealth Mycological Institute, Kew, Surrey, 1950.  
Recently revised maps of horticultural interest are:  
193. *Gloeosporium concentricum* (Grev. ex Fr.) Berk. and Br. on cabbage, cauliflower, etc.  
194. *Elsinoe phaseoli* Jenkins on lima bean and other spp.  
195. *Puccinia helianthi* Schw. on sunflower and other *Helianthus* spp.  
196. *Venturia cerasi* Aderh. on cherry.  
197. *Cercospora brassicae* (Fautr. and Roum.) Höhnelt on cabbage, cauliflower, etc.  
198. *Fusicladium carpophilum* (Thüm.) Oudem. on peach, plum, almond, etc.  
199. *Taphrina cerasi* (Fuckel) Sadeb. on cherry and related *Prunus* spp.  
200. *Uromyces fabae* (Pers.) de Bary on broad and field beans, vetch.  
202. *Oospora pustulans* Owen and Wakef. on potato.  
203. *Phytophthora boehmeriae* Sawada on *Boehmeria*, *Citrus*, apple.  
204. *Phytophthora porri* Foister on leek.  
205. *Pythium vexans* de Bary on potato, Gramineae, etc.  
207. *Pythium ultimum* Trow on various hosts.  
208. *Pythium debaryanum* Hesse on various hosts.  
209. *Puccinia pringsheimiana* Kleb. on gooseberry, *Carex*, *Ribes*.  
210. *Phoma foveata* Foister on potato.  
211. *Puccinia menthae* Pers. on *Mentha* spp.  
213. Bean mosaic virus on beans.  
214. *Thecaphora solani* on Andean potato (*Solanum andigenum*).  
215. *Puccinia kuehnii* (Kruger) Butler on *Saccharum* spp.  
216. *Puccinia asparagi* on asparagus.  
1460. HOPKINS, J. C. F.  
A descriptive list of plant diseases in Southern Rhodesia and list of bacteria and fungi.  
*Mem. Dep. Agric. S. Rhod.* 2, 1950, pp. 106.  
The Memoir brings up to date descriptions of the more important diseases and gives recommendations for their control.  
1461. SMITH, H. C.  
Collar-rot of apples and gooseberries.  
*Orchard. N.Z.*, 1950, 23: 11: 11-14, bibl. 4, illus.



A collar-rot of Cox's Orange Pippin apple trees and of gooseberry bushes has caused trouble for a number of years in several parts of New Zealand. It is caused by *Phytophthora cactorum* and is likely to produce greatest loss in wet, poorly-drained soils. A black discoloration of the bark occurs about ground level, and when the stems are girdled the trees or bushes die. The best control measure is to improve drainage of both subsoil and topsoil. In addition, care should be taken in cultivation to avoid injuries, and in early infections diseased parts can be cut out and painted with bordeaux paste. The trunks can also be sprayed with bordeaux mixture.

1462. WOODHEAD, C. E.

**Ripe-spot of apples; how it develops: control measures.**

*Orchard. N.Z.*, 1950, 23: 11: 7, 9, bibl. 4, illus.

Ripe spot, caused by the fungus *Neofabraea mali-corticis*, is described, particularly with reference to severe infection observed on Sturmer apples in New Zealand. A spray treatment recommended is bordeaux mixture 2-6-100 in mid-January, and 1-4-100 in mid-February.

1463. LOUW, A. J.

**The germination and longevity of spores of the apple-scab fungus, *Venturia inaequalis* (Cke) Wint.**

*Sci. Bull. Dep. Agric. S. Afr.* 285, 1948, pp. 16, bibl. 23, illus. [received 1950].

A laboratory study. The spores germinated readily in contact with liquid water. They became adherent to the surface on which they rested even before visible germination took place. Germination of both ascospores and conidia occurred at temperatures ranging from 0° to 26° C. There was no germination at 30° C. after 18 hours. Prolonged storage in dry air of leaves bearing perithecia did not impair the viability of ascospores. Exposure of ascospores to high humidities after their discharge reduced their longevity, but exposure to a dry atmosphere tended to prolong their life.

1464. BLUMER, S.

**Organische Schorfbekämpfungsmittel. (Scab control with organic materials.)**

*Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 67-70.

Results of experiments indicate that, for scab control on sulphur-tolerant apple varieties, sulphur-containing sprays are superior to organic fungicides. The organic chemicals tested, thiuram preparations, a carbamate and a dinitrorhodanbenzol preparation, were most effective on sulphur-shy varieties, when applied as post-blossom sprays following a standard (sulphur or sulphur+copper) pre-blossom treatment.

1465. McNEW, G. L.

**The natural and synthetic quinones in relation to the functions of plants.**

*Bull. Torrey bot. Cl.*, 1950, 77: 294-7, bibl. 10.

In field trials, dichloronaphthoquinone (Phygon) gave almost perfect control of apple scab at 6 oz. in 100 gal. of spray and was effective against *Phytophthora*

*infestans* on potato in spray mixtures containing 1 lb. per 100 gal.

1466. GOLLMICK, F.

**Beobachtungen über den Apfelmehltau. (Observations on apple mildew.)**

*NachrBl. dtsh. PflSchDienst, Berlin*, 1950, 4: 205-14, bibl. 30.

Observations carried out at the Naumburg branch of the Biological Central Institute confirm earlier findings that a large number of apple varieties are resistant to apple mildew (*Podosphaera leucotricha*). Examination of *Malus* varieties and hybrids leads to the conclusion that of all wild species the group *Malus pumila* alone is susceptible to mildew. The other wild apples and their hybrids show marked resistance. Study of the progenies from cross-pollinated Ontario apples with highly susceptible varieties have shown that the behaviour of the variety to mildew is genotypically obligate.

1467. PHILLIPS, W. R., AND POAPST, P. A.

**Fungal rot control.**

*A.R. Canada Dep. Agric. Fruit Veg. Prod. Res. Cttee*, 1949, 1950, p. 19.

Linda apples were withdrawn from storage after 179 days, wrapped in fungicide-impregnated paper and placed in a ripening room at a temperature of 65° F. and a relative humidity of 95%. The fungicides used were (1) ortho-hydroxybiphenyl at a concentration of 0.34 g. per sq. ft. of paper, and impregnated by the use of xylene, and (2) sulphur, at a concentration of 0.157 g. per sq. ft. of paper. Plain wraps were used as a control, and some fruits were left unwrapped. After 24 days it was observed that sulphur wraps had very little effect on the amount of wastage. The phenyl compound, however, gave substantial control of rots, but caused a skin discoloration resembling scald on all the fruits. As xylene alone was not included in the test, there is no evidence concerning the origin of the damage.

1468. WILHELM, S., AND THOMAS, H. E.

**Verticillium wilt of bramble fruits with special reference to *Rubus ursinus* derivatives.**

*Phytopathology*, 1950, 40: 1103-10, bibl. 22, illus.

*Verticillium* wilt (*V. albo-atrum*) is one of the most destructive diseases of bramble fruits in California. The horticultural varieties of *Rubus ursinus* derivation, Boysen, Nectar, and Young, are susceptible, whereas Logan and Mammoth are highly resistant. Seedlings of Boysen, Nectar, and Young varieties segregate for susceptibility and resistance. Tomato crops build up soil infestation with *verticillium*.—Univ. Calif.

1469. MIHAĬLOVSKIĬ, V. S.

**The control of leaf spot on black currants. [Russian.]**

*Sad i Ogorod* (Orchard and garden), 1950, No. 12, pp. 33-4.

Results of experiments in the Ukraine have shown that leaf spot [*Pseudopeziza ribis* ?] of black currants was most effectively controlled by 3 applications of bordeaux mixture. The first application was made soon after

the leaf buds opened, the second while the berries were still small and the third after harvest.

1470. FORESTRY COMMISSION.

**Chestnut blight caused by the fungus *Endothia parasitica*.**

*Bookl. For. Comm.* 3, 1950, pp. 2+4 plates, 2s. 6d.

A description is given of the disease which attacks sweet chestnut, *Castanea sativa* Mill., and of the causal fungus, with 5 coloured figures showing symptoms. Chestnut blight, common in the United States, has appeared in Italy and Spain, and the purpose of this booklet is to describe the disease so that familiarity with the symptoms may lead to rapid recognition of the fungus, should it ever reach Britain.

1471. AOKI, K.

**On fungi concealed in the lenticels of healthy mulberry trees.** [Japanese, English summary.]

*Bull. imp. sericult. Exp. Stat. Tokyo*, 1941, 10: 229-81, illus., from abstr. in *Jap. J. Bot.*, 1942, 12: (1) [received 1950].

524 strains of fungi, some of them pathogenic, were obtained from 1,249 lenticels of mulberry trees in Japan. Only one strain was obtained from any one lenticel. The fungi were generally present as mycelium but sometimes in the form of spores. Under normal conditions the mycelium did not extend beyond the lenticel, although occasionally it was found to invade the primary cortex. By enclosing them in a moist chamber, the fungi were induced to develop on the surface of the lenticels.

1472. HIRATSUKA, N.

**Studies on the pear rust caused by *Gymnosporangium haraeaeum* Syd.** [Japanese.]

*Trans. Tottori Soc. agric. Sci.*, 1940, 8: 11-53, from abstr. in *Jap. J. Bot.*, 1942, 12: (5)-(6) [received 1950].

The relationship between the incidence of pear rust, caused by *Gymnosporangium haraeaeum*, and the prevalence of juniper bushes affected by the same disease is discussed. *Juniperus chinensis* is widely grown in some parts of Japan as an ornamental, the different strains of this species varying in their susceptibility to the disease. The strain known as "Ibuki-kaiduka" is particularly susceptible, 80% of the plants in the Tottori district being infected. Pears also vary in susceptibility, those of European or American origin being far more resistant than those of Japanese or Chinese origin. Information is given on the germination of the teleutospores and on control of the disease.

1473. WEAVER, L. O.

**Effect of temperature and relative humidity on occurrence of blossom blight of stone fruits.**

*Phytopathology*, 1950, 40: 1136-53, bibl. 34, illus.

Conidia of *Sclerotinia fructicola* germinated at 5° C. to 30° C., optimum temperatures being 15° C. to 25° C. Dusted on petals, stamens, and stigmas of peach, they germinated on all organs at 100% relative humidity, on only the stamens and stigmas at 96% and on only

the stigmas at 80%. They infected blossoms in a saturated atmosphere within 18 hrs. at 10° C., 8 to 12 hrs. at 15° C., 11 hrs. at 20° C., and 5 hrs. at 25° C. Open blossoms are more liable to infection than unopened buds, but unopened blossoms blighted at high relative humidities. Infection occurred on exposed stamens and stigma.

1474. JUNE, R. I.

**Verticillium wilt of stone fruit.**

*N.Z. J. Agric.*, 1950, 81: 307-8, illus.

Verticillium wilt has become fairly widespread in New Zealand, and it has been recently found attacking fruit trees. Various cultivated and wild host plants are mentioned. Where a diseased tree has been removed, treating the soil with chloropicrin or formalin is advised. Recommendations for avoiding attack are: (1) Apricots, peaches or plums should not be planted on land previously used for tomatoes or potatoes. (2) Where infection has already occurred the land should not be allowed to become too dry. (3) Weeds such as fat-hen and nightshade should be eradicated. (4) Irrigation and other run-off water should not be allowed to flow through wilt-infested land into a stone fruit area. (5) Badly affected trees should be removed, 4 years or more being allowed before replanting unless a non-susceptible type of tree is chosen. So far apple and pear trees have not been known to contract the disease. (6) Care should be taken to ensure that the source of the trees to be planted is free from disease and that the land in which they have been raised has not previously been used for tomato or potato production.

1475. PONT, W.

**Brown rot control experiments in the Stanthorpe district, 1948-49 and 1949-50.**

*Qd agric. J.*, 1950, 71: 265-8.

In trials in Queensland on the nectarine variety Goldmine, good control of brown rot (*Sclerotinia fructicola*) was obtained with long schedule lime-sulphur treatment, consisting of fortnightly sprays commencing in mid-November and carried through to harvest. The lime-sulphur was applied at 1-80 strength, later reduced to 1-120. In additional experiments on Pond's Seedling plums, the long schedule strong lime-sulphur treatment gave a 60% reduction in infection. Results obtained with peaches, included in the second series of trials, were inconclusive.

1476. JUGANOVA, O. N., AND SUŠICKÝ, L. A.

**The use of copper naphthenate in stone fruit disease control.** [Russian.]

*Sad i Ogorod* (Orchard and garden), 1950, No. 12, pp. 30-3.

For the satisfactory control of monilia disease of apricots and sweet and sour cherries 3 copper naphthenate sprays are recommended. The first application should be made when the buds begin to swell, the second before they burst, and the third when the first flowers are open. The three recommended sprays are applied in decreasing concentrations. Detailed instructions are given on the preparation of the compound, which consists of copper sulphate and naphthalene soap, by an emulsifying process using oil and clay, and its subsequent dilution to the required concentration.



## 1477. BALDACCI, E., AND ORSENIGO, M.

Quattro anni d'impiego del calendario d'incubazione della *Peronospora della vite* (1946-1949). (Four years' observations on the incubation period of vine downy mildew, 1946-1949.)

*Atti Inst. bot. Univ. Pavia, Ser. 5*, 1950, 8: 89-134, bibl. 18.

An account of observations, made in a region of northern Italy, on the duration of the incubation period of vine downy mildew [*Plasmopara viticola*] in relation to the weather, with the object of timing the application of fungicides.

## 1478. MÜLLER-STOLL, W. R.

Die Bedeutung des Regen- und Wärmeklimas für die Epidemiologie und Bekämpfung der Rebenperonospora in den südwest-deutschen Weinbaubezirken. (The significance of rain and warm weather in the outbreaks and control of vine peronospora in vine-growing regions of southwest Germany.)

*Z. PflKrankh.*, 1950, 57: 161-71.

The climate of the Baden vine-growing district differs from that of the rest of Germany in its high rainfall (in Upper Baden an average of 90-100 mm. per month from May to October). This, and its low spring temperatures are conducive to delayed growth of the vines and favour the development of downy mildew (*Plasmopara viticola*). In Baden, therefore, usually two sprayings are made before blossoming and two after, the first application, as a preventive, about the end of May, before the first outbreaks of infection.

## Nematodes.

(See also 1336.)

## 1479. YOUNG, R. A., TORGENSEN, D. C., AND ANDERSON, C. G.

Meadow nematodes (*Pratylenchus* sp.) on mazzard cherry and forage plants and weeds in nursery rotations.

*Plant Dis. Repr.*, 1950, 34: 230-1, bibl. 4.

A *Pratylenchus* species has been found associated with retarded development of mazzard (*Prunus avium*) seedlings commonly used as rootstocks for flowering cherry and for sweet and acid cherry varieties. If further investigation proves that the nematode is the primary cause of the trouble, control will be complicated by the wide host range.

## 1480. FRANKLIN, M. T.

Two species of *Aphelenchoides* associated with strawberry bud disease in Britain.

*Ann. appl. Biol.*, 1950, 37: 1-10, bibl. 18.

Two species of nematode, *Aphelenchoides fragariae* and *A. ritzeana-bosi*, may be concerned in the production of the two symptoms known as "cauliflower" and "red plant". *A. olesistius* is now regarded as a synonym for *A. fragariae*, and the host ranges of this species and of *A. ritzeana-bosi* are considerable. The morphological characters of the two species are described.

C.W.S.H.

## Mite and insect pests.

(See also 1513, 1517, 1523, 1524, 1540m, o, r, s, t, x, 1761, 2166.)

## 1481. GAMBRELL, F. L., AND YOUNG, H. C., JR.

Habits, rates of infestation and control of woolly apple aphid in nursery plantings.

*J. econ. Ent.*, 1950, 43: 463-5, bibl. 2, being

*J. Pap. N.Y. St. agric. Exp. Stat.* 820.

Red Spy and Northern Spy varieties on their own roots were found to be much less susceptible to infestation by woolly aphid, *Eriosoma lanigerum*, than were Baldwin, R. I. Greening, Cortland, Roger's McIntosh, Early McIntosh and Double Red Delicious. The use of the Spy varieties as scions did not reduce infestation of the roots of susceptible seedling rootstocks. BHC (12%  $\gamma$ -isomer) at 2 lb. with 1 pint of a liquid oil-based sticker to 100 gal. water has shown considerable promise for the control of this pest.

## 1482. WOOD, C. A.

The strawberry aphid, *Pentatrichopus fragariae* (Theob.), in North Wales, with special reference to the maintenance of healthy strawberry stocks in non-fruit-growing areas.

*J. hort. Sci.*, 1950, 26: 22-34, bibl. 16.

This paper reports the continuation of a study in North Wales [see *H.A.*, 17: 661] of populations of the strawberry aphid, the only known natural vector of strawberry virus diseases. The aphid was very scarce in 1940 and 1941 following severe winters. Breeding in the autumn of 1942 and during the following mild winter resulted in high populations in 1943. They were high again in 1944, but low in 1945. The strawberry variety Huxley Giant carried more aphids than other varieties. The fungus *Empusa planchoniana* (Cornu) Petch is a frequent parasite of *P. fragariae*. Meteorological data indicate that migration of the aphid is likely to occur in the lower Dee Valley in almost any year in which aphid populations are large. From experimental evidence it is concluded that an extension of strawberry growing in the non-strawberry-growing districts of Carnarvonshire and Anglesey would necessitate the same measures of aphid control that are required elsewhere.—Univ. Coll. of N. Wales, Bangor.

## 1483. MICHELBACHER, A. E., MIDDLEKAUFF, W. W., AND WEGENEK, E.

The walnut aphid in northern California.

*J. econ. Ent.*, 1950, 43: 448-56, bibl. 4.

The walnut aphid, *Chromaphis juglandicola*, one of the most destructive pests of walnuts, is attacked by a number of natural enemies, notably predators. Investigations have shown that DDT, used against codling moth, tends to increase the aphid problem and should therefore be used in combination with aphicides. The aphid was controlled best during the first half of May when insecticides appeared to have the least adverse effect upon the host-predator balance. A combination of codling moth spray and 1 lb. of 14% nicotine dry concentrate, or 0.67 lb. of  $\gamma$ -BHC, or 0.33 lb. 25% parathion wettable powder, or 0.25 pt. of 20% tetrathyl pyrophosphate per 100 gal. of spray all resulted

in excellent control of walnut aphid, the nicotine concentrate being the safest. For mid- and late-season control very good results were obtained where aphicides were applied with an air blast sprayer.

## 1484. JANNONE, G.

Alimentazione e danni delle cetonie.  
The mode of feeding of cetonids and the damage due to them.)

*Agricoltura pugliese*, 1947, 1, Nos. 10-12, pp. 12, bibl. 14, illus., from abstr. in *Rev. appl. Ent.*, 1950, 38: 391-2.

In the spring or early summer of 1947, the author observed injury to the young fruits of almond and peach, the stems of lupins, the ears of wheat and the flowers and young fruits of sweet and mandarin oranges in a district of Apulia, by adults of the cetonids, *Oxythyrea funesta*, Poda, *Tropinota squalida*, Scop., and *Epicometis* (T.) *hirta*, Poda. On young almonds they eroded the surface and sometimes penetrated to the kernels, up to 6 attacking a single fruit. Severely injured fruits dropped from the trees, but lightly damaged ones healed over and were often usable. The damage was undoubtedly due to chewing. The young peaches were similarly injured. On orange, the beetles not only destroyed the male flowers in their search for pollen, but also damaged the young fruits and the peduncles. Some trees were protected by covering them with strong muslin, but the crop on those not so covered was almost wholly destroyed.

## 1485. GALLAY, R., AND OTHERS.

Le hanneton et le ver blanc. (Cockchafer and white grub control.)  
*Rev. romande Agric. Vitic.*, 1950, 6: 89-103, illus.

The entire number of the journal is devoted to the cockchafer problem, the subject being discussed under the following heads: (1) The importance of the pest and general aspects of its control; (2) the biology of the cockchafer; (3) control, (a) collecting by hand, (b) chemical, with a description of large-scale control measures carried out in 4 areas, and an assessment of their results; (4) white grub control.

## 1486. VAN LEEUWEN, E. R.

Chestnut weevils and their control with DDT.

*Proc. 39th annu. Conv. north. Nut Grs' Ass.* 1948, Norris, Tenn., pp. 54-60 [received 1951].

Satisfactory control of *Curculio proboscideus* and *C. auriger* was obtained by 3 thorough applications of 4 lb. of 50% wettable DDT in 100 gal. water. The first treatment was carried out about 30 days before the first nuts were due to drop, and the second and third after intervals of 12 days. [See also *H.A.*, 20: 1499.]

## 1487. NICKELS, C. B.

Experiments in control of the pecan weevil.

*J. econ. Ent.*, 1950, 43: 552-4, bibl. 1.

Tabulated results are presented of trials on the control of pecan weevil, *Curculio caryae*, in Texas during 4 seasons, with sprays containing BHC, chlordane, DDT, DDT+parathion, lead arsenate, parathion or toxaphene.

## 1488. GARMAN, P.

The plum curculio.

*Amer. Fruit Gr.* 1951, 71: 2: 26-7, 38, bibl. 1, illus.

In the U.S.A. the plum curculio causes severe damage, not only to stone fruit, but also to apples interplanted with peaches or plums. A diagram shows the influence of temperature on the activity of the pest, and a table summarizes Connecticut observations on the effectiveness of different spray treatments and on their cost.

## 1489. DRIGGERS, B. F.

Effect of parathion on immature stages of plum curculio, oriental fruit moth and codling moth within the host plant.

*J. econ. Ent.*, 1950, 43: 474-6, bibl. 1.

The observations described were carried out in peach and apple orchards in New Jersey. 1 lb. 25% and 1.5 lb. 15% wettable powdered parathion were used in 100 gal. of water. It was found that a high percentage of the recently entered larvae of the 3 species were killed, though it was not determined whether they were killed by fumigation, by parathion entering the galleries or by absorption of the material through the plant tissues. Analyses of apples made 10 days after spraying showed 0.1 p.p.m. or less of parathion residue.

## 1490. RAMBIER, A.

À propos du *Vesperus xatarti* (Muls.). (The longicorn beetle *Vesperus xatarti* (Muls.).)  
*Progr. agric. vitic.*, 1951, 135: 89-93, illus.

This nocturnal beetle was found causing damage in Catalan vineyards of the eastern Pyrenees, the larvae gnawing the vine roots. Its biological cycle is described and methods of control discussed, with particular reference to soil applications of HCH, SPC, chlordane, and SNP.—École nationale d'Agriculture, Montpellier.

## 1491. MYBURGH, A. C., AND STUBBINGS, W. A. K.

Control of fruit-flies.

*Fmg S. Afr.*, 1951, 26: 7-8, 13, illus.

The Mediterranean fruit-fly is present throughout the western Cape Province. The Natal fruit-fly, which has been known around Cape Town for some years, is gradually spreading and is now in the Groot Drakenstein and Wemmershoek areas, to a lesser extent at Somerset West, and possibly also in Elgin. Their life cycles and habits and control measures are described. Poison-bait spraying, with sodium fluosilicate, lead arsenate, or Thiophos (containing 15% parathion), is recommended.—Western Province Fruit Res. Stat., Stellenbosch.

## 1492. HANNA, A. D.

Studies on the Mediterranean fruit-fly *Ceratitis capitata* Wied. (Diptera Trypanidae). II. Biology and control.

*Bull. Soc. Fouad. 1er Ent.*, 1947, 31: 251-85, from abstr. in *Rev. appl. Ent.*, 1950, 38: 452-3.

*Ceratitis capitata* usually infests nearly all the fruits of apricot and peach in Egypt, so that their cultivation has greatly declined in recent years. This paper comprises an account of several years' investigations concerned primarily with its control. Poisoned baits and their application are described.



1493. RIVNAY, E.

**The Mediterranean fruit fly in Israel.***Bull. ent. Res.*, 1950, 41: 321-41, bibl. 9.

The status of the Mediterranean fruit fly (*Ceratitis capitata*) in Israel is reviewed briefly. Apricots, peaches and guavas are the most severely attacked of the summer fruits. The ecology of the various stages of the insect is discussed. It is pointed out that, in addition to temperature, the type of food influences the length of development of the larva. The threshold of development in the temperature development hyperbola has been found to be between 10° and 11° C. A study of the length of life of the adult showed that survival was longest between 16° and 19° C., at which temperature it took 100 days to reach 50% mortality and 200 days 100% mortality. The fluctuation of the fly population in Israel is discussed in detail. It is pointed out that the prevalence of host fruits is one of the great factors responsible for these fluctuations. An analysis of the climatic conditions month by month and its influence upon the fly population is discussed. [From author's summary.]—Agricultural Research Station, Rehovot.

1494. MYBURGH, A. C.

**Mealy-bug control on table grapes.***Fmg S. Afr.*, 1951, 26: 14-16, illus.

The two species of mealy-bug causing greatest losses in table grapes in the Cape Province are *Pseudococcus maritimus* and *P. citri*. They cause direct injury to the vines by sucking the sap and reducing their vitality. The indirect effects are also of great importance in table grapes, which are blemished by the presence of mealy bugs, their ovisacs, their honey dew secretion and ultimately the sooty mould which develops on the honey dew. Parathion is recommended for their control and suitable formulations and concentrations are given.

1495. MITROFANOV, P. I.

**New means of controlling mealy-bugs on grapes. [Russian.]***Sad i Ogorod* (Orchard and garden), 1950, No. 12, pp. 42-3, illus.

In trials in Russia, thiophosphate and pyrophosphate used against the mealy-bug [*Dactylopius adonidum*] gave better control than the insecticides used hitherto. The suggested rates of applications are 2 to 2.5 l. sprays of 1% pyrophosphate or 0.5% thiophosphate, or 50 gr. of 1% thiophosphate dust per vine.

1496. HAMILTON, A.

**The blackberry mite (*Aceria essigi*).***N.Z. J. Sci. Tech. Sect. A*, 1949 (published Oct. 1950), 31: 2: 42-5, bibl. 10, illus.

The blackberry mite was found in the Nelson district in 1946 and since then has been found in other parts of the country. Infested blackberries remain hard and bright red when uninjured berries are ripe and black. Its seasonal cycle under New Zealand conditions is described.—D.S.I.R., Nelson.

1497. EATON, J. K., AND DAVIES, R. G.

**The toxicity of certain synthetic organic compounds to the fruit-tree red-spider mite.***Ann. appl. Biol.*, 1950, 37: 471-89, bibl. 20.

Ninety synthetic organic compounds were tested for their acaricidal effect on winter eggs, summer eggs and adult females of *Metatetranychus ulmi*. Azoxybenzene

and *n*-dodecyl thiocyanate were toxic to all stages. Bis-(*p*-chlorophenyl) methyl carbinol and 4-chlorobenzene were highly toxic to summer eggs and adult mites. The former substance is structurally related to DDT, which has poor acaricidal properties. Examination of the relationship between acaricidal effect and molecular structure showed that, where there were two benzene nuclei, activity to the summer eggs and adults could be influenced by alterations to the bridging group and chlorine substitution in the *para* position of one nucleus.—East Malling Res. Stat. C.W.S.H.

1498. GEIER, P.

**Vers une lutte rationnelle contre les acar-  
iens des arbres fruitiers. (The control of  
fruit tree red spider mites.)***Rev. romande Agric. Vitic.*, 1951, 7: 11-14, illus.

A diagram illustrates the degree of red spider (*Metatetranychus ulmi* and *Tetranychus urticae*) infestation from May to September in an apple orchard at Pully, Lausanne, as affected by DDT and lead arsenate treatment for codling moth respectively. For red spider control in infested orchards a winter wash of a 4% yellow petroleum oil and a pre-blossom application of a thiophosphoric acid ester is recommended.

1499. LEATHERDALE, D.

**Notes on the degree of galling caused by  
*Eriophyes avellanae* Nalepa (Acarina,  
Eriophyidae) on hazel.***Ent. mon. Mag.*, 1950, 86: 357-8, bibl. 6.

A comparison of trimmed and untrimmed hazel hedges (*Corylus avellana*) showed much lower counts of the mite *Eriophyes avellanae* on those that had been kept trimmed during the past 5 years.

1500. HOFMASTER, R. N., AND DANIELSON, L. L.

**Toxicity of dinitro ortho secondary amyl  
phenol to the two-spotted spider mite on  
strawberry plants.***J. econ. Ent.*, 1950, 43: 561-2, bibl. 1.

Evidence is presented showing that, in addition to its herbicidal effectiveness, 75% dinitro ortho secondary amyl phenol controlled the two-spotted spider mite, *Tetranychus bimaculatus*, in Blakemore strawberries in Virginia during the winter 1949-50.

1501. SY, M.

**Über die Bedeutung der zweiten Generation  
des Apfelwicklers (*Cydia pomonella* L.) und  
deren Bekämpfung. (The significance of the  
second generation of the codling moth.)***Z. PflKrankh.*, 1948, 55: 29-34, bibl. 4 [received 1951].

By two sprayings, with a week's interval, at the end of May and beginning of June with 0.05% E605 f. the first larval generation of the codling moth was practically eliminated, E605 f. 0.01%, Gerasol spray 2%, and lead arsenate 0.4% being less effective. A single application of lead arsenate was effective against the second generation and so gave the best final result.

1502. RICHARDSON, C. H., AND DU CHANOIS, F. R.

**Codling moth infestation of the tops of apple  
trees.***J. econ. Ent.*, 1950, 43: 466-70, bibl. 12, being *J. Pap. Ia agric. Exp. Stat.* J-1774.

Experiments on codling moth [*Carpocapsa pomonella*] control in two Iowa apple orchards sprayed with DDT during 1949 showed that the extreme tops of the trees carried considerably more infested fruit than did the lower branches. The following possible explanations are suggested: preference by the codling moth for the top of apple trees as a site for oviposition and faulty coverage or imperfect maintenance of spray deposit. Control measures are discussed briefly.

1503. MAY, A. W. S.

The importance of the calyx spray in the codling moth control programme.

*Qd agric. J.*, 1950, 71: 325-7.

Results of trials against the codling moth, *Cydia pomonella*, on Delicious apples in the Stanthorpe district of Queensland showed that when a DDT cover spray schedule was used the omission of the calyx spray had no influence on the excellent control obtained.

1504. GRIOT, M., AND ICART, A.

Observaciones sobre "*Balcarcia bergi*" Brèthes parásito del "bicho de cesto". (Observations on *Balcarcia bergi*, a parasite of *Oiketicus kirbyi*.)

*Rev. Invest. agric. B. Aires*, 1948, 2: 197-204, bibl. 4, illus. [received 1951].

The biology, distribution and habits of *Balcarcia bergi*, a hymenopterous parasite of the bagworm, *Oiketicus kirbyi* [a pest of many fruits including apples and citrus], were studied at the Instituto de Sanidad Vegetal, Buenos Aires. The parasite is at present of only local value in controlling the bagworm, but the possibility of extending its distribution is suggested.

1505. TIRELLI, M.

Frenare la diffusione della fillossera. (Checking the spread of phylloxera.)

*Humus*, 1950, 6: 8: 22-3, illus.

A popular account of precautions to be taken to prevent the spread of phylloxera, mentioning the use of trenches, about 1 m. wide and 80 cm. deep and filled with water, for separating healthy and infested vineyards.

1506. SCHMIDT, G.

Das Schadbild der Birnentriebwespe (*Cephus compressus* F.). (The injury caused by the pear twig sawfly, *Cephus compressus*.)

*Nachr. dtsch. PflSchDienst., Braunschweig*, 1951, 3: 17-19, bibl. 8, illus.

An illustrated description is given of the damage caused to the tips of pear, and occasionally apple, shoots observed in the Berlin district. The symptoms were similar to those produced by the apple twig cutter, *Rhynchites coerulesus*.

1507. GEIER, P.

Contribution a l'étude de la cochenille rouge du poirier (*Epidiaspis leperii* Sign.) en Suisse. (The red scale insect of pear (*Epidiaspis leperii*) in Switzerland.) [German summary 2 pp.]

Reprinted from *Rev. Path. veg. Ent. agric. Fr. as Publ. Stat. féd. Ess. vitic. arboric. Lausanne* 389, 1949, pp. 177-266, bibl. 40, illus. [received 1951].

After an introduction with notes on synonymy, previous work, host plants, and distribution of the red scale insect in Switzerland (with map), details are given of its morphology, the structure and formation of the shield, biology and control. Control measures include the application of mineral oil containing DNC (4-6%) in winter, and fumigation with hydrocyanic acid as used against the San José scale.

1508. MOYANO, A., RENNER, M. J., AND BORSANI, L. F.

Lucha contra las cochinillas mediante el empleo de aceites lubricantes usados. (Control of coccids by means of used lubricating oils.) [Summaries in English, Italian, French and German.]

*Experimenta*, 1949, 2, Nos. 1-3, pp. 54-61, bibl. 3, from abstr. in *Rev. appl. Ent.*, 1950, 38: 386.

A stock emulsion was prepared from used motor oil, diesel oil, fatty acids, commercial ammonia and water (8:1:2:1:3 by volume) and dispersed in water at 4-8%. The dilute sprays were applied in October 1948 at a temperature of 20-5° C. to olive trees infested with *Aspidiotus hederae*, Vall., *Chrysomphalus paulistus*, Hemp., and *Parlatoria oleae*, Colv. They proved as effective as commercial winter oils, 6-7% concentrations giving the best results; 8% caused some injury to the leaves, though no leaf-drop occurred. The emulsions broke rapidly after application and scale coverage was excellent.

Other pests.

(See also 1540c, p.)

1509. MINISTRY OF AGRICULTURE, LONDON.

The goldfinch, chaffinch and greenfinch.

*Adv. leafh. Minist. Agric. Lond.* 229, 1950, pp. 4, illus., 1d.

The goldfinch and chaffinch are generally beneficial, though the latter does some damage by attacking fruit buds and garden produce. The greenfinch in small numbers does some good by destroying insects, but, if numerous, becomes harmful especially by digging up and eating the seeds of horticultural crops.

1510. HAYNE, D. W.

Mouse populations in orchards and a new method of control.

*Quart. Bull. Mich. agric. Exp. Stat.*, 1950, 33: 160-8, bibl. 2, illus.

Poisoning orchard mice, *Microtus pennsylvanicus*, with zinc-phosphide-treated cracked corn distributed by a hand seeder is an effective and labour-saving control measure.

1511. ANON.

Foil protects trees.

*Amer. Nurseryman*, 1950, 92: 11: 22-3.

A note on the successful use of aluminium foil strips for protecting young fruit trees from damage by rabbits and mice (reported by J. D. Winter in *Pap. misc. J. ser. Minn. agric. Exp. Stat.* 710). A temperature difference of 11-24° was recorded under the bark of wrapped and unwrapped limbs, and it is suggested that the foil might, therefore, also protect the trees from sunscald injury during winter and early spring.



**Antibiotics.**

(See also 1331o, 1650, 2012.)

1512. McDONOUGH, E. S., BELL, L., AND ARNOLD, G.

**A water-labile fungistatic extractive characterizing living trees.**

*Nature*, 1950, 166: 1034, bibl. 3.

Common wood-destroying fungi, such as *Schizophyllum commune*, are, as a rule, unable to attack healthy trees or even to cause serious trouble in wounded trees. This resistance of living trees is accounted for by the presence of a fungistatic substance which was extracted with 95% ethyl alcohol in various quantities from the wood of catalpa and some other trees. While alcoholic extracts have retained their antibiotic nature, water extracts have been found to lose this property rapidly. The observation that dilute concentrations have a stimulating effect suggests that there may be a connexion between these fungistatic materials and growth-regulating substances.—Marquette University, Milwaukee, Wisconsin.

1513. KIDO, G. S., AND SPYHALSKI, E.

**Antimycin A, an antibiotic with insecticidal and miticidal properties.**

*Science*, 1950, 112: 172-3, bibl. 2.

Antimycin A, a crystalline antibiotic isolated from cultures of an unidentified species of *Streptomyces*, has shown marked toxicity against coleopterous pests such as Mexican bean beetle larvae, *Epilachna varivestis* Muls., and against red spider mites, *Tetranychus* sp. Its specificity of action appears to be strictly limited, and it has proved harmless to Lepidoptera and several other types of insect.

**Fungicides.**

(See also 1540u, v, 2166.)

1514. AMERICAN FRUIT GROWER.

**Compatibility chart for insecticides and fungicides.**

*Amer. Fruit Gr.*, 1951, 71: 2: 36-7.

This coloured chart for 1951 takes account of the latest developments and observations.

1515. TRAPPMANN, W.

**Kupferspritzmittel im Pflanzenschutz—Rückblick und Ausblick. (Copper spray preparations in plant protection—a review.)** *Z. PflKrankh.*, 1948, 55: 260-94, bibl. 51 [received 1951].

The copper-containing preparations used in plant disease control are discussed under these headings: I. Economy in the use of copper by choosing the most favourable time for spraying and by improving the technique and appliances for spraying. II. The copper preparations generally used: (a) bordeaux mixture, (b) burgundy mixture, (c) bordeaux and burgundy dusts, (d) copper oxychloride preparations. III. Copper economy by using the preparations at low concentrations. IV. Copper economy by modifying the preparation, (a) spreaders, wetters, and stickers, (b) modifications of the copper sulphate-lime spray fluid, (c) the elaboration of copper-saving preparations, (d) organic acids as added substances. V. The fungicidal action and copper economy of various copper compounds.

VI. Copper economy and copper substitutes by using copper-free fungicides, (a) copper economy by using sulphur, (b) other inorganic substances as substitutes for copper, (c) organic substances as substitutes for copper.

1516. BALDWIN, M. M.

**Sulfur in fungicides.**

*Industr. engng Chem.*, 1950, 42: 2227-30, bibl. 32.

Sulphur, used either in its elemental form or as an active constituent of the dithiocarbamates, or in its indirect role as a constituent of copper sulphate, is involved in almost two-thirds of the fungicide production of the U.S.A. Different theories on the mechanism of the toxic action of sulphur are discussed.

**Insecticides.**

(See also 1247, 1284, 1497, 1540a, d, e, f, h, i, j, k, l, n, w, 2177.)

1517. SELLKE, R.

**Über die Tiefenwirkung der modernen Insektenbekämpfungsmittel. (On the penetration of synthetic insecticides into the leaf tissue.)**

*NachrBl. dtsh. PflSchDienst, Berlin*, 1950, 4: 221-7, bibl. 12, illus.

Gall-forming aphids were used in laboratory experiments to study the penetration into leaf tissue of several synthetic insecticides at their normal concentrations. Thiophosphoric acid esters proved very toxic to *Tetraneura ulmi*, especially when sprayed on to the upper leaf surface, and benzene hexachloride preparations also had a considerable, though less pronounced, action on the aphids inside the gall. In the latter case the effect was due mainly to gas formation by the insecticide. Similar results were obtained against *Pemphigus spirothecae*, which forms galls in the peduncle of poplar leaves. Treatment of the upper leaf surface with these two types of chemical were also effective against *Brachycaudus* and *Doralis* spp. producing leaf curl in plum and *Euonymus* respectively, while *Myzus* spp. on primula and cyclamen remained unaffected. Caterpillars of *Gracillaria syringella* living within the epidermis layers of lilac leaves were killed by thiophosphoric acid esters. DDT did not show any penetrating action.—Biol. Zentral-anst. Berlin.

1518. LORD, K. A., AND POTTER, C.

**Mechanism of action of organo-phosphorus compounds as insecticides.**

*Nature*, 1950, 166: 893-4, bibl. 5.

Dealing with parathion, HETP and TEPP. A full account of the investigations is to be published elsewhere.

1519. PALM, C. E.

**Development and use of synthetic organic insecticides.**

*Advances Chem. Ser.* 1, 1950, pp. 218-22, bibl. 13.

In a general review of recent developments some of the problems that have arisen are discussed, including variation in susceptibility to insecticides within individual insect species, the development of resistance in certain insects and the effect of upsetting the balance in nature.—Cornell Univ.

1520. POTTER, C.

**Insecticides and their study.***Fruitgrower*, 1951, No. 2873, pp. 103-4.

A brief survey of the more important, new synthetic organic insecticides, including DDT, BHC, chlordane, toxaphene, aldrin, dieldrin, HETP and TEPP, parathion, bis(bis dimethyl-amino) phosphonous anhydride, allethrin and the allyl analogue of cinerin. The specificity of some of the insecticides to different insect species and instar-specificity are discussed, and the need for a more profound knowledge of the insects is emphasized.

1521. WACHS, H., JONES, H. A., AND BASS, L. W.

**New safe insecticides.***Advances Chem. Ser.* 1, 1950, pp. 43-8, bibl. 9.

In the search for safe insecticides, hundreds of products have been prepared and subjected to screening tests against insects. This paper presents information on six materials related to piperonyl butoxide, tested in combination with pyrethrins. [Authors' synopsis.]

1522. MILLER, R. E.

**Agricultural diluents.***Agric. Chemls.* 1950, 5: 11: 43-7, 78-9; 12: 45-8, 93-5, bibl. 60.

Agricultural diluents may increase, decrease, or nullify the toxicity or killing power of certain insecticides, fungicides and herbicides. Botanical flours have little or no toxic or insecticidal value. There is a wide variation in the toxic or killing power of non-metallic diluents, not only between various types, but even among individual diluents of the same type. Numerous factors influence or modify the effectiveness of agricultural diluents, such as: particle size, density, fluidity, moisture, pH value, absorbing power, compatibility (chemical and physical), adhesiveness, specificity, particle shape, toxicity, electrostatic charge, mixing and amount used.

1523. STAPLEY, J. H.

**BHC as a fruit spray.***Fruitgrower*, 1950, No. 2870, pp. 843-4.

BHC has been used as an alternative to tar oil and DNC winter sprays over the past 2 years with very good results at the Fernhurst Research Station and in some commercial orchards. The recommended programme for apples is as follows: 1. Bud burst—4 lb. dispersible powder per 100 gal. against apple blossom weevil. 2. Green cluster—4 lb. per 100 gal. against aphid, caterpillar, and sucker. 3. Pink bud—4 lb. per 100 gal. against woolly aphid and capsid. 4. Petal fall—2 lb. per 100 gal. against sawfly. The green cluster spray is considered to be the key spray. BHC dispersible powders can be incorporated in the routine lime-sulphur apple scab sprays. Red spider, which usually appeared after BHC treatment, was controlled by parathion (6 fl. oz. per 100 gal.). While BHC was more difficult to use on plums than apples the procedure was generally similar. A warning is given against the use of BHC in orchards where susceptible under-crops such as soft fruit are grown.

1524. MCKINLAY, K. S., AND KIRBY, A. H. M.

**Benzyl alcohol as an aid to penetration of certain ovicides.***Nature*, 1951, 167: 153, bibl. 1.

Two seasons' work showed that benzyl alcohol greatly increases the toxicity of certain ovicides towards the winter eggs of the fruit tree red spider mite, *Metatetranychus ulmi*. In the cases of dodecyl thiocyanate, azobenzene and azoxybenzene, levels themselves non-toxic became fully effective when the penetrant was added at 2.5%. In the second year, when the minimum dosages were determined more closely, a complete kill was obtained with several combinations of azoxybenzene and benzyl alcohol, of which a mixture at the rates of 0.05 and 1.25% respectively is considered to be the most economical. Using dodecyl thiocyanate at 0.05% and azobenzene at 0.2%, at least 2% benzyl alcohol was required to give 95-100% kill.—East Malling Research Station.

1525. MAYER, E. L., AND OTHERS.

**Tests for synergism between nicotine and phthalonitrile and between nicotine and 2,3,4,5,6-pentachloroanisole.***J. econ. Ent.*, 1950, 43: 533-7, bibl. 15.

Under the test conditions used, mixtures of nicotine and phthalonitrile were definitely synergistic against the pea aphid, armyworm, California oakworm, and diamond back moth. They showed doubtful or no synergism against the green dock beetle, celery leaf tier, and pomace fly. They showed antagonism against greenhouse thrips. Mixtures of nicotine and pentachloroanisole showed neither synergism nor antagonism against the diamond back moth and the armyworm. [From authors' summary.]

**Spraying methods and apparatus.**

(See also 1333e, 1987.)

1526. ZOBRIST, L., GÜNTART, E., AND HOFFMANN, E.

**Nebelblaser oder Motorspritze im Obstbau. (Mist blower or power sprayer for fruit trees.)***Schweiz. Z. Obst- u. Weinb.*, 1950, 59: 492-7.

The data presented show that fungicide applications for the control of apple scab by mist blower at 10 times the normal concentration and one-tenth of the normal volume are at least as effective as ordinary spraying. Suggestions are made for the combined summer treatment of scab and codling moth, but the application of winter washes by mist blower is still in the experimental stage.

1527. ZÄCH, C., KUNDERT, J., AND BIERI, F.

**Schorfbekämpfungsversuche mit Nebelblaser im Jahre 1950. (Scab control with a mist blower in 1950.)***Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 59-67.

In trials conducted by the Wädenswil and Oeschberg Research Stations, good results were obtained in controlling apple scab with fungicides applied by a mist blower. While no experimental data are available on insecticidal applications, it is stated that good control of cockchafers, cherry fruit flies and colorado beetles has been achieved with this apparatus. In viticulture, on the other hand, the use of a mist blower was found to be impracticable.



1528. MOSER, F.

Der Nebelblaser im Dienste der Kirschenfliegenbekämpfung. (The mist blower for cherry fruit fly control.)

Schweiz. Z. Obst- u. Weinb., 1951, 60: 74-6, illus.

Very good results have been obtained against cherry fruit flies in Switzerland with the "Lawrence L 80" mist blower, and suggestions are made regarding its economic use.

1529. DEONG, E. R., PEER, K. C., AND FANCHER, L. W.

A new generator for producing dry aerosols with organic insecticides.

J. econ. Ent., 1950, 43: 542-6, illus.

A new dry aerosol generator is described which propels the contained insecticides into the atmosphere in micron size particles without the use of solvents, compressed gases, or combustion processes.

1530. SCHNEIDER, F.

Eine einfache Vorrichtung zur quantitativen Anwendung insektizider Stäubemittel im Laboratorium. (Simple apparatus for the quantitative application of insecticidal dusts in the laboratory.)

Z. PflKrankh., 1949, 56: 10-19, bibl. 16, illus. [received 1951].

With the apparatus described insects can be dusted directly, or the dust can be applied to glass plates, dishes, leaves or whole plants, with which the insects later come in contact. Insects tested included the leek moth (*Acrolepia assectella*) and the pea weevil (*Sitona lineata*).

### Spray residues.

(See also 1379, 1540.)

1531. HENSILL, G. S., AND GARDNER, L. R.

Some poisonous residue factors in use of two new organic insecticides.

Advances Chem. Ser. 1, 1950, pp. 102-7, bibl. 2.

Tests on fruit and vegetables have shown that, with proper usage, dosage and timing, the pure gamma isomer of hexachlorocyclohexane [BHC] leaves no poisonous residue nor produces off-flavours. On some crops applications must be made before fruits or heads form; on others they may be made to within 3 to 4 weeks of harvest, and on others still within a few days of harvest. Tetraethyl pyrophosphate [TEPP], owing to its rapid decomposition, can safely be applied up to harvest time.

1532. HOSKINS, W. M., AND MESSENGER, P. S.

Microbioassay of insecticide residues in plant and animal tissues.

Advances Chem. Ser. 1, 1950, pp. 93-8, bibl. 9, illus.

Apparatus and procedures using small shell vials are described, and data for LD<sub>50</sub> to female houseflies are given for parathion,  $\gamma$ -hexachlorocyclohexane and p,p'-DDT in terms of micrograms per vial and per sq. cm. The small vial method is also extensively

used in following the development of resistance in insects.—Univ. of Calif., Berkeley.

1533. PAGAN, C., AND HAGEMAN, R. H.

Determination of DDT by bioassay.

Science, 1950, 112: 222-3, bibl. 4.

A method involving the use of guppy fish is described, with an example of its practical application to DDT residues on tomatoes and beans.

1534. WESTLAKE, W. E., AND FAHEY, J. E.

DDT and parathion spray residues on apples.

Advances Chem. Ser. 1, 1950, pp. 117-22, bibl. 4.

Comparisons of spray residues were made in 1948 between apples grown in the dry, irrigated Yakima Valley and the moister Mississippi Valley where more spray applications are needed. Residues, which were higher in the Mississippi Valley, are tabulated for a number of spray schedules. The use of adhesives such as nicotine-bentonite-oil increased DDT residues at harvest, but had little effect on final parathion residues owing to the speed at which this material weathers.—U.S. Dep. Agric., Beltsville, Md.

1535. HARTZELL, A.

Toxicity of spray residue of fresh and processed fruits and vegetables.

Advances Chem. Ser. 1, 1950, pp. 99-101, bibl. 7.

Apricots, prunes, and peaches from sprayed trees were tested, by methods described, on mosquito larvae for toxicity due to spray residues. The sprays used were DDT, DDD, parathion, toxaphene, TEPP, and basic lead arsenate. These tests, and others on strained processed peas and peaches that had been treated with TEPP, BHC and methoxychlor, showed bioassay with mosquito larvae to be practicable, subject to the limitation that the untreated natural product is in itself non-toxic to the larvae.—Boyce Thompson Inst.

1536. BOWEN, C. V., AND EDWARDS, F. I., Jr.

Polarographic determination of 0,0-diethyl 0-p-nitrophenyl thiophosphate (parathion).

Advances Chem. Ser. 1, 1950, pp. 198-201, bibl. 6.

A polarographic method of determining parathion is described, in which an accuracy of  $\pm 1\%$  is obtained.

1537. WALKER, K. C.

Parathion spray residue on soft fruits, apples, and pears.

Advances Chem. Ser. 1, 1950, pp. 123-7, bibl. 3.

The soft fruits referred to in this paper are stone fruits—apricot, cherry, peach, and prune. In studies in Washington State the amount of parathion spray residue on stone fruits was found to be roughly proportional to the time elapsing between the date of application and the date of analysis. In Delicious apples sprayed with 1 lb. and 4 lb. of 25% wettable parathion powder per 100 gal., the rate of loss was the same in both cases, namely 80% to 85% in 12 to 13 days and 93% to 100% in 30 to 32 days. In 55 samples of 4 varieties of apple, collected from commercial orchards, there was no significant difference in parathion residue due to the concentration of parathion applied an

average of 54 days earlier; residues ranged from 0 to 0.14 p.p.m.

1538. SCHAEFFER, L.

Sur la rétention de l'acide cyanhydrique par les fruits soumis à la désinfection. II. (The retention of hydrocyanic acid by fumigated fruit. II.)

*Ann. Épiphyt.*, 1948, 14: 265-81, being *Mem. Sér. Ent. Inst. nat. Rech. agron.* 6 [received 1951].

Pears and apples exposed for an hour to a concentration of 3.5 g/m<sup>3</sup> HCN, which is fatal to the San José scale, retained, when taken out of the fumigation chamber, 0.5 to 1.3 mg. of HCN per 100 g. On cherries, plums and apricots the amount was 8 mg. Aeration after the treatment removes part of the deposited acid; after 2 hrs., for example, only one-third to a quarter of it is retained, most being removed during the first hours of aeration. The retention is relatively high on fruits that are bruised or cut.

1539. WALKER, K. C.

Selenium residue on and in the peel of Washington apples.

*Advances Chem. Ser.* 1, 1950, pp. 108-11, bibl. 5.

In studies in Washington State with Jonathan, Delicious and Winesap apples, fruit that had not been sprayed with a selenium insecticide, known as Selocide, had selenium residues of about 0.001 p.p.m. compared with residues of 0.020 to 0.155 p.p.m. on fruits that had received one or more sprays of Selocide. The addition of a light grade petroleum oil increased the amount of selenium residue on and in the peel. There were no significant differences between the varieties or between fruits from different parts of the tree.

*Noted.*

1540.

a BLACKITH, R. E.

Bioassay systems for the pyrethrins. III. Application of the twin cross-over design to crawling insect assays.

*Ann. appl. Biol.*, 1950, 37: 508-15, bibl. 12.

b BÖMEKE, H.

Von der Decke tropfendes Kondenswasser schädigt Früchte im Lager. (Condensed water dripping from the ceiling damages fruit [apples] in storage.)

*Mitt. ObstbVersuchsring Jork*, 1950, No. 21/22, p. 125.

c BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE.

Japanese beetle.

*Pict. Sheet U.S. Dep. Agric.* 4, revised 1950, pp. 2, illus.

d DANISH, A. A., AND LIDOV, R. E.

Colorimetric method for estimating small amounts of aldrin (compound 118).

*Advances Chem. Ser.* 1, 1950, pp. 190-7, bibl. 5.

e ELLIOTT, M., NEEDHAM, P. H., AND POTTER, C.

The insecticidal activity of substances related to the pyrethrins. I. The toxicities of two synthetic pyrethrin-like esters relative to that of the natural pyrethrins and the significance of the results in the bioassay of closely related compounds.

*Ann. appl. Biol.*, 1950, 37: 490-507, bibl. 19.

f FAIRING, J. D., AND WARRINGTON, H. P., JR.

Colorimetric determination of small quantities of 1,1,1-trichloro-2,2-bis(p-methoxyphenyl)-ethane [methoxychlor].

*Advances Chem. Ser.* 1, 1950, pp. 260-5, bibl. 6.

g GLASS, E. H.

Parathion injury [to apples].

*Amer. Fruit Gr.*, 1951, 71: 2: 28, 56-7, illus. See also *H.A.*, 20: 2643.

h GUTHRIE, F. E.

Effect of temperature on toxicity of certain organic insecticides.

*J. econ. Ent.*, 1950, 43: 559-60, bibl. 11.

i HALL, S. A.

Organic phosphorus insecticides.

*Advances Chem. Ser.* 1, 1950, pp. 150-9, bibl. 50.

j HALLER, H. L.

Determining new insecticides in formulations and residues.

*Advances Chem. Ser.* 1, 1950, pp. 65-71, bibl. 56.

k HARRIS, T. H.

Partition chromatography in analysis of insecticide formulations.

*Advances Chem. Ser.* 1, 1950, pp. 266-70, bibl. 4.

l DE JONG, J. R.

Field method for the determination of the particle size of oil mists.

*Ann. appl. Biol.*, 1950, 37: 516-26, bibl. 4, illus.

m LEES, A. D.

Diapause and photoperiodism in the fruit tree red spider mite (*Metatetranychus ulmi* Koch).

*Nature*, 1950, 166: 874-5, bibl. 10.

n LIDOV, R. E., AND OTHERS.

Alkali-stable polychloro organic insect toxicants, aldrin and dieldrin.

*Advances Chem. Ser.* 1, 1950, pp. 175-83, bibl. 16.

o MILLER, L. W.

Factors influencing diapause in the European red mite.

*Nature*, 1950, 166: 875, bibl. 5.

p MINISTRY OF AGRICULTURE, LONDON.

Chafer beetles.

*Adv. leafl. Minist. Agric. Lond.* 235, 1950, pp. 4, illus., 1d.



- q MINISTRY OF AGRICULTURE, LONDON.  
Precautions in the use of insecticides, fungicides and weed-killers.  
*Adv. leafl. Minist. Agric. Lond.* 374, 1950, pp. 4, 1d.
- r MOERICKE, V.  
Eine Farbfalle zur Kontrolle des Fluges von Blattläusen insbesondere der Pfirsichblattlaus, *Myzodes persicae* (Sulz). (A colour trap to determine the flight of aphids, especially the green peach aphid (*Myzodes persicae*).)  
*NachrBl. dtsh. PflSchDienst., Braunschweig*, 1951, 3: 23-4, bibl. 12, illus.
- s NEWCOMER, E. J.  
Orchard insects of the Pacific Northwest and their control.  
*Circ. U.S. Dep. Agric.* 270, 1950, pp. 63, illus.
- t REICH, H.  
Madige Äpfel durch die Larve der Ampferblattwespe (*Amestategia glabrata* Fall). (Maggoty apples caused by the larvae of the dock sawfly.)  
*Mitt. ObstbVersuchsring Jork*, 1950, No. 21/22, pp. 121-3, bibl. 3, illus.
- u SMITH, C. F., AND CLAYTON, C. N.  
Peach spray information.  
*Spec. Circ. N.C. agric. Exp. Stat.* 5, 1950, pp. 11.
- v SMITH, F. B.  
Control of diseases and insect pests in the vineyard.  
*N.Z. J. Agric.*, 1950, 81: 321-30, illus.
- w SUMERFORD, W. T.  
Chemistry and toxicity of some organo-fluorine insecticides.  
*Advances Chem. Ser.* 1, 1950, pp. 160-74, bibl. 114.
- x THIEM, H.  
Betrachtungen zur Lage und Bekämpfung der San José-Schildlaus im südwestdeutschen Befallsgebiet. (The situation regarding the San José scale in south-west Germany, and its control.)  
*Z. PflKrankh.*, 1948, 55: 17-29, bibl. 17 [received 1951].
- y U.S. DEPARTMENT OF AGRICULTURE.  
Windbreaks and shelterbelts for the Plains States.  
*Leafl. U.S. Dep. Agric.* 276, 1950, pp. 4, illus, 5 c.

## WEEDS AND WEED CONTROL.

## General.

(See also 1603k, s.)

1541. CRAFTS, A. S., AND HARVEY, W. A.  
Weed control.  
*Advances Agron.*, 1949, 1: 289-320, bibl. 206 [received 1951].

In this review of recent developments in weed control, the various methods are discussed from the standpoint of the basic chemical and agronomic principles involved, and an attempt is made to designate the role of each in field practice. The properties of herbicides are discussed as well as their uses, a prominent place being given to 2,4-D. Some of the changes in agricultural practice that have arisen as a result of selective chemical weed control are briefly indicated.

1542. N.E. WEED CONTROL CONFERENCE CO-ORDINATING COMMITTEE.  
Report of the coordinating committee of the N.E.W.C.C. for 1950.  
*Suppl. Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 51-62.

The primary purpose of this report is to indicate where agreement has already been reached as to the best herbicides to use for particular purposes and to draw attention to fields where further research is required. From a horticulturist's point of view it is of interest to note that no agreement has been reached over weed control in potatoes, soft fruits, orchards, nurseries and ornamental plants, nor in vegetables apart from asparagus, carrots, onions, peas and sweet corn.

1543. GRIGSBY, B. H.  
Recommendations of the research committee of NCWCC for 1950.  
*Proc. 6th annu. Meet. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., 107-10.

These include recommendations for controlling specific weeds, weed control in certain crops, acceptance of recognized abbreviations of herbicides such as 2,4-D, TCA, IPC, and definitions of terms used in weed control.

1544. ENNIS, W. B., JR., AND NORMAN, A. G.  
The application of herbicidal sprays to field plots and their evaluation.  
*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 36-42.

Statistical studies of the yield data from 3 field-plot experiments involving spray applications of growth regulators to soya beans indicated that in spite of the great care exercised in making the treatments, the operator was biased in applying the sprays. While it was possible partially to overcome the variation thus caused by harvesting whole plots instead of single rows the importance of unbiased work and greater precision in experiments is stressed.—Camp Detrick, Frederick, Md.

## Herbicides.

(See also 1247, 1288, 1300, 1541, 1543, 1559, 1561, 1562, 1563, 1564, 1565, 1603g, 2150.)

1545. DUTTON, W. C.  
Results with newer herbicides in 1949.  
*Proc. 6th annu. Meet. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 20-2.

A discussion based on 27 abstracts received on newer herbicides and other available information. The numerous chemicals tested are considered separately.

1546. QUASTEL, J. H.

**2,4-dichlorophenoxyacetic acid (2,4-D) as a selective herbicide.**

*Advances Chem. Ser.* 1, 1950, pp. 244-9, bibl. 44.

In a review of the history of 2,4-D as a selective herbicide, since its phytocidal properties were first investigated in England in 1941 and 1942, the literature is discussed with reference to its herbicidal action, the effects of soil conditions, the reversibility of its action and the action on it of *p*-aminobenzoic acid. Among the conclusions drawn it is pointed out that it is the chlorine atoms in 2,4-D that make the substance so valuable, because they render it resistant to bacterial attack.

1547. LOOMIS, W. E.

**Basic research in weed control.**

*Proc. 6th annu. Meet. N. centr. Weed Control Conf.* 1949, Sioux Falls, S. Dak., pp. 101-3.

The penetration of 2,4-D into the leaves of plants may involve physiological as well as physico-chemical reactions. The rate of penetration is increased on many leaves by wetting agents, and the effect may be more specific than a simple lowering of surface tension. Deep killing of the roots of woody and herbaceous perennials almost certainly depends upon downward translocation of 2,4-D in the phloem. Heavy applications of the more toxic materials should be avoided, as these may destroy the phloem before translocation is completed. Correct timing of treatments to avoid injury to crops is very important.

1548. LOOMIS, W. E., AND OTHERS.

**Investigations on physiological and chemical factors influencing practices in weed control.**

*Res. Rep. 6th annu. N. centr. Weed Control Conf.* 1949, Sioux Falls, S. Dak., pp. 210-15.

Most of the 10 abstracts given under this heading deal with weed control practices in, and their effect on, grain crops. Light treatments with a naphtha fraction appeared to stimulate bean plants. Experiments on translocation of 2,4-D are of great importance in the control of woody and perennial plants. It is suggested that non-lethal ( $\frac{1}{4}$  lb. ?) doses of 2,4-D repeated 3 or 4 times within a week may result in greater translocation than a single lethal dose.

1549. NORMAN, A. G., AND NEWMAN, A. S.

**The persistence of herbicides in soils.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 7-12, bibl. 16.

The persistence of organic herbicides, such as 2,4-D, in soils depends, on the one hand, on their physical properties and chemical nature, and, on the other, on the microbiological environment of the soil. In humid regions the concentration of soluble herbicides in or near the surface may soon be reduced by leaching, and in soils with vigorous microbiological activity a rapid decomposition may take place. Microbiological inactivation may, however, be slow at first, because few individuals in the population are able to effect the specific oxidation initially required, but it may increase

with subsequent applications when adequate numbers of the necessary organisms are present. Persistence is likely to be greatest under arid conditions and least where both rainfall and soil temperatures are high. In view of this, field experiments on persistence carried out at different places can vary considerably and no generalizations can be made safely without reference to soil and climatic conditions.

1550. TAFURO, A. J., VAN GELUWE, J. D., AND CURTIS, L. E.

**Drift and volatility comparison of an amine salt and ester form of 2,4-D under field conditions.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 31-5, bibl. 2.

The results of this test follow fairly closely the results obtained in greenhouse work [see *H.A.*, 19: 3049]. With wind velocities of 5 to 7 miles per hour the triethanolamine salt of 2,4-D was less hazardous to use than the butyl ester formulation where drift or volatilization endangered nearby crops susceptible to 2,4-D.

1551. KING, L. J.

**Dichloral urea (experimental herbicide 2) and sodium 2,4-dichlorophenoxyethyl sulfate (experimental herbicide 1) as selective herbicides.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 302-9.

Dichloral urea, a new selective weed-killer applied to the soil either as a liquid spray or dust, controls grasses and certain dicotyledons such as legumes. Among grasses annual crab grass appeared to be the most sensitive to low rates (5-10 lb. per acre), perennial grasses such as Bermuda grass needed 50 lb. per acre, while quack [couch] grass and Johnson grass needed 50-100 lb. per acre for effective control. In tests conducted by the Boyce Thompson Institute, crucifers, cucurbits, beetroots, potatoes and cotton showed tolerance of dichloral urea. Trials with sodium 2,4-dichlorophenoxyethyl sulphate have been previously reported [see *H.A.*, 19: 3047], and in this paper further good results are noted [see also *H.A.*, 21: 1595].

1552. TISCHLER, N., BATES, J. C., AND QUIMBA, G. P.

**A new group of defoliant-herbicidal chemicals.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 51-84, bibl. 4, being *Contr. Dep. Hort. Kans. St. Coll.* 226.

The 3,6-endoxohydrophthalates have been found to show striking plant response effects. To this group of compounds belong 3,6-endoxotetrahydrophthalic acid, its anhydride and its salts, and 3,6-endohexahydrophthalic acid, its anhydride and its salts. This new group of chemicals shows noteworthy herbicidal properties when applied to vegetation, when used as a pre-emergence treatment for many plants, or when injected. They are effective at extremely low dosages per acre, particularly against grasses. Some evidence indicates that they are hormonal in action. The resistance of certain economic crops to harmful action by them suggests their use as selective weed killers. Many plant species are listed showing their



susceptibility to the various forms of 3,6-endoxohydrophthalates. [From authors' summary.]

1553. FREED, V. H., AND BIEMAN, H. E.

**IPC—a new weed killer.**

*Stat. Bull. Ore. agric. Exp. Stat.* 483, 1950, pp. 8, illus.

IPC (isopropyl n-phenyl carbamate) is valuable as a selective herbicide in that it effectively kills grasses with little or no harm to broad-leaved plants. It is well suited for weeding vegetable, bulb and strawberry plots and can be applied either pre- or post-emergence. Technical IPC sometimes known as INPC or IPPC, is a greyish-white crystalline substance nearly insoluble in water, melts at 84° C. and volatilizes as the temperature rises. It is not translocated in the plant like 2,4-D and 2,4,5-T but prevents growth, hence it is most effective at a very early growing stage. IPC for weed control is used either in a wettable or an emulsifiable form. For control of annual grasses, particularly in bulbs and strawberries, autumn application is recommended, and where broad-leaved weeds are also a problem a combination of dinitro or 2,4-D and IPC is suggested. The most successful combination for the control of perennial grasses is IPC dissolved in an oil emulsion. Tables show crop tolerance and rates of applications for weed species.

1554. YOWELL, H. L.

**Progress in the herbicidal application of oils.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 43-50, bibl. 14.

This is a review of recent progress in weed control with petroleum oils covering: A. Petroleum products as contact herbicides. B. Petroleum in selective weed control applications. (1) Selective weed control with blanket applications of Stoddard solvents; (2) by directional applications of Stoddard solvents; (3) with other petroleum products; (4) selective crab grass eradicators; (5) conditions under which oils have been used as selective herbicides. C. Petroleum products as activators for 2,4-D. D. Petroleum in aquatic weed control applications. E. Liquefied petroleum gases as fuels for flame weeders.

1555. SHERWOOD, L. V.

**Pentachlorophenol as a herbicide.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 85-7, bibl. 1.

Although pentachlorophenol and its derivatives exhibit a toxic effect on all vegetation with which they come in contact, these materials can be used as selective weedkillers in certain crops if proper precautions are taken.

**Apparatus.**

(See also 1603 l, p, t, w, x.)

1556. MACDONALD, W. P., AND OTHERS.

**Miscellaneous projects [in weed control].**

*Res. Rep. 6th annu. N. centr. Weed Control Conf.* 1949, Sioux Falls, S. Dak., pp. 216-20.

Seven abstracts dealing with equipment and methods of application are grouped under this heading.

1557. ANON.

**A boom spray for weed control.**

*Qd agric. J.*, 1950, 71: 181-2, illus.

A short, illustrated account is given of the Klean Krop boom spray now available on the market in Queensland. It is claimed that at 4 m.p.h. the rate of application per acre is 4 gal. at 25 lb. pressure, 5 gal. at 50 lb. and 7 gal. at 100 lb.

1558. WILSON, J. D., AND BRUNER, H. E.

**Post-emergence control of weeds in row crops by the use of contact sprays applied with a shielded boom.**

*Proc. 6th annu. Meet. N. centr. Weed Control Conf.* 1949, Sioux Falls, S. Dak., pp. 78-80.

Twelve different crops (principally vegetables) were used in these experiments, but the main trials were with sweet corn and soya beans. Some 40 different materials and formulations were tested. The results obtained by spraying with a shielded boom appeared promising; of the chemicals used, Santobrite, Shell 130 and Sulfasan were the most effective.

**Particular weeds.**

(See also 1603h, i, j, l, m, q, r, u, v, z, 2152, 2166, 2173.)

1559. LARSON, A. H.

**Control of annual and winter annual weeds.**

*Proc. 6th annu. Meet. N. centr. Weed Control Conf.* 1949, Sioux Falls, S. Dak., pp. 15-16.

Results obtained from several sources and from widely separated areas are discussed. The chemicals used in most cases were 2,4-D and 2,4,5-T, either alone or in combination with each other or with trichloroacetate or pentachlorophenol. A list showing the relative susceptibility of some common annual and winter annual weeds is included.

1560. WOOD, H. E.

**Perennial weed control.**

*Proc. 6th annu. Meet. N. centr. Weed Control Conf.* 1949, Sioux Falls, S. Dak., pp. 16-19.

The most troublesome of the perennial weeds met with in crop production in the Great Plains area are: quack grass, *Agropyron repens*; Canada thistle, *Cirsium arvense*; perennial sow thistle, *Sonchus arvensis*; field bindweed, *Convolvulus arvensis*; leafy spurge, *Euphorbia esula*; hoary cress, *Cardaria draba*; Russian knapweed, *Centaurea repens*; bladder campion, *Silene latifolia*; toadflax, *Linaria vulgaris*; poverty weed, *Iva axillaris*; hedge bindweed, *Convolvulus sepium*; horsetail, *Equisetum arvense*. Both mechanical and chemical eradication are discussed.

1561. WIEDE, W.

**Unkrautbekämpfung durch Wuchsstoffe.**

**(Weed control with growth substances.)**

*Z. PflErnähr. Düng.*, 1950, 50: 175-86.

This review includes a list showing the susceptibility of the most important German weeds to U46 (2,4-D).—Badische Anilin- und Soda-Fabrik, Ludwigshafen.

1562. KNOWLES, G.

**Use of herbicides in control of perennial herbaceous weeds. Other herbaceous perennials.**

*Res. Rep. 6th annu. N. centr. Weed Control Conf.* 1949, Sioux Falls, S. Dak., pp. 35-41.

The reaction of some 75 perennial weeds to 2,4-D and 2,4,5-T is tabulated.

1563. BRAMBLE, W. C., AND WORLEY, D. P.  
Control of black locust with chemical sprays.  
*Proc. N.E. States Weed Control Conf.*,  
New York, 1950, pp. 257-8.

In a field in Pennsylvania where the black locust tree [*Robinia pseudacacia*] became a weed, good control was obtained with repeated applications of ammonium sulphamate and the isopropyl ester of 2,4-D.

1564. BAKKE, A. L., AND OTHERS.  
Use of herbicides in control of perennial herbaceous weeds. Canada thistle.  
*Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 1-8.

In summarizing the results of experiments described in 17 abstracts it is stated that sodium chlorate appears to be still the best herbicide for the elimination of Canada thistle, *Cirsium arvense*. Control with 2,4-D was effective when applied in the early stages and when more than one treatment was made. 2,4,5-T was also extensively tested.

1565. ZAHNLEY, J. W., AND OTHERS.  
Use of herbicides in control of herbaceous perennial weeds. Field bindweed.  
*Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 17-23.

Sixteen abstracts given show that good control of bindweed, *Convolvulus arvensis*, was accomplished by applications of 2,4-D. Complete elimination occurred, however, in only a few instances in these tests.

1566. ZAHNLEY, J. W., AND OTHERS.  
Use of herbicides in control of herbaceous perennial weeds. Hoary cress.  
*Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 14-16.

The 6 abstracts submitted suggest that hoary cress, *Lepidium draba* or *Cardaria pubescens*, is more readily controlled in grass than on cultivated land. Various amounts of 2,4-D, mainly the esters, were used; a combination of 2,4-D with 2,4,5-T gave no better results than 2,4-D alone.

1567. PAVLYCHENKO, T. K., AND OTHERS.  
Use of herbicides in control of perennial herbaceous weeds. Leafy spurge.  
*Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 26-32.

Twelve abstracts are given describing trials involving the use of 2,4-D and 2,4,5-T, various mixtures of the two, amate, mixtures of amate and 2,4-D, borascu, razorite, polybor and polybor-chlorate. The results obtained suggest that leafy spurge, *Euphorbia esula*, can be controlled economically both by the systemic and contact chemicals used.

1568. PETTEY, F. W.  
The cochineal (*Dactylopius opuntiae*). Its history, distribution, biology, and what it has accomplished in the control of prickly pear in South Africa.  
*Bull. Dep. Agric. S. Afr. 296*, 1950, pp. 1-12, illus.

The cochineal insect (*Dactylopius opuntiae*), imported

from Australia into South Africa in 1937, has spread rapidly and has caused much destruction to the prickly pear (*Opuntia megacantha*). An account is given of its life history, its spread in South Africa, its predators, the ladybird beetles *Cryptolaemus montrouzieri* and *Exochomus flavipes*, and its fungal parasite, *Empusa lecanii*.

1569. PETTEY, F. W., AND MARAIS, S. J. S.  
The control of cochineal in spineless cactus plantations.  
*Bull. Dep. Agric. S. Afr. 296*, 1950, pp. 13-23, illus.

The cochineal insect, introduced into South Africa to attack the prickly pear—[see above, No. 1568], is now causing serious damage to all spineless cactus varieties cultivated for fodder. Trials for controlling it with DDT and parathion are described.

1570. KNOWLES, G., AND OTHERS.  
Use of herbicides in control of perennial herbaceous weeds. Russian knapweed.  
*Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 33-4.

From 3 abstracts given it appears that Russian knapweed, *Centaurea picris*, is not easily controlled with 2,4-D or with a combination of 2,4-D and 2,4,5-T. Treatments with the ester of 2,4-D mixed with  $H_2SO_4$ ,  $Na_2CO_3$  or HCl, however, gave promising results.

1571. WOOD, H. E., AND OTHERS.  
Use of herbicides in control of perennial herbaceous weeds. Perennial sow thistle (*Sonchus arvensis*).  
*Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 9-13.

Of 9 abstracts given, 5 deal with control in cereal crops. Sow thistle growing in grass or on land not under tillage was satisfactorily controlled when sprayed with 1-2 lb. acid of 2,4-D per acre during the flowering stage.

1572. MINISTRY OF AGRICULTURE, LONDON.  
Stinging nettles.  
*Adv. Leaflet. N.A.A.S. Lond. 47*, 1950, pp. 4, 1d.

The two species of stinging nettles common in fields and gardens, *Urtica dioica* and *U. urens*, are described with measures for their control, the former with sodium chlorate, MCPA, salt, or kainit, the latter by hoeing and spraying with sulphuric acid, DNOC or MCPA.

1573. BOTANY SECTION, QUEENSLAND.  
Purple thorn apple and hairy or recurved thorn apple.  
*Qd agric. J.*, 1950, 71: 217-20, illus.

Illustrated descriptions are given of the purple thorn apple, *Datura tatula*, and the hairy or recurved thorn apple, *D. metel*, both of which have been added to the list of declared noxious plants in Queensland. Hand-pulling, chipping or mowing the plants before seeding will destroy them if carried out persistently. Results with 2,4-D have been very variable, but recent trials with 2,4,5-T have given more promising results.

1574. DUTTON, W. C., AND OTHERS.  
Use of herbicides for control of undesirable seedling grasses.  
*Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 205-9.



Nine abstracts are given, 7 dealing with crab grass in turf, 1 with wild oats and foxtail in rape and 1 with annual grasses in flax. The chemicals used were TCA sodium salt, PMAS (phenyl mercury acetate), two organic mercury compounds (not named), potassium cyanate, kerosene and Stoddard solvent.

1575. GRIGSBY, B. H., AND OTHERS.

Use of herbicides in control of perennial herbaceous weeds. Perennial grasses.

Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949, Sioux Falls, S. Dak., pp. 42-50.

Control experiments on Johnson grass, *Sorghum halepense*, Bermuda grass [*Cynodon dactylon*] and quack or couch grass, *Agropyron repens*, are reported in 29 abstracts; TCA appeared to be the most effective chemical used.

1576. CHAUGULE, B. A.

Bermuda grass (Hariali), *Cynodon dactylon*. Poona agric. Coll. Mag., 1950, 41: 169-79, bibl. 18.

A general account is given of Bermuda grass, its propagation, soil and climatic requirements and its uses. It is the main lawn and pasture grass of the tropics, but is at the same time troublesome as a weed in many crops. Work on its eradication as a weed is reviewed and several mechanical methods are suggested for its control in different situations. The use of chemicals has so far given variable results.

1577. WALTER, E. E., AND WOLF, D. E.

Preliminary results on the use of wetting agents with crabgrass killers.

Proc. N.E. States Weed Control Conf., New York, 1950, pp. 220-4.

Data presented here indicate that wetting agents applied with weed killers had a beneficial effect on crabgrass control in turf.

1578. SNYDER, W. E.

Control of *Agropyron repens* with herbicides.

Proc. N.E. States Weed Control Conf., New York, 1950, pp. 266-71, bibl. 3.

Heavy quack [couch] grass infestation in a nursery at Cornell University was effectively reduced by ploughing followed by 2 or 3 applications of ATC (ammonium thiocyanate), STCA (sodium trichloroacetate), or ATCA (ammonium trichloroacetate) at low concentrations, or by a single application of a high concentration of the chemicals.

*Weed control in vegetables and potatoes.*

1579. RAHN, E. M., AND OGLE, W. L.

A progress report on chemical weed control in asparagus, lima beans, cantaloupes, potatoes, and sweet corn.

Proc. N.E. States Weed Control Conf., New York, 1950, pp. 138-42, being Misc. Pap. Del. agric. Exp. Stat. 78.

*Asparagus.* Best control during the harvest season was obtained with sodium pentachlorophenate and granular cyanamide, and during the post-harvest season with aerocyanate and granular cyanamide. *Lima beans.* Two experiments were carried out. The use of 2,4-D gave only fair weed control in the first one,

when drought followed sowing, but good control in the second when the soil following application was moister. A dinitro compound, Koppers Selective K1131, applied immediately after sowing gave excellent weed control in both experiments. *Cantaloupes.* Pre-emergence applications of Dow Selective Weed Killer and Shell Weed Killer 130 gave the best control. *Potatoes.* All 5 chemicals used gave good control. Apparently, however, the potato plants in this experiment needed full cultivation even though weeds were not a problem. *Sweet corn.* Both pre- and post-emergence applications of 2,4-D were very effective.

1580. NOLL, C. J., AND ODLAND, M. L.

Chemical weed control in sweet corn, spinach, asparagus, and other vegetable crops.

Proc. N.E. States Weed Control Conf., New York, 1950, pp. 143-7.

*Sweet corn.* The alkanalamine salt of 2,4-D was applied at various concentrations as a pre- or post-emergence treatment. Some yield reductions were noted in both treatments, which might have been less significant had the weeds been a greater problem. *Spinach.* The 21 treatments tested all reduced the stand of weeds. Yields were significantly increased over the check by only one chemical, Dowicide G, at the rate of 2½ lb. per acre, while 10 materials significantly decreased yields and reduced stands. *Asparagus.* Again 21 treatments were made. The best weed control was obtained with 2,4-D in the form of the butyl ester at 4 lb. per acre, with Dow Selective and Stoddard Solvent, and with granular cyanamide at the rate of 800 lb. per acre. *Peas.* Pre- and post-emergence sprays were made with 8 herbicides, all significantly reducing the growth of weeds. The best control was with Dow Selective at the rate of 3 qt. in 100 gal. water per acre. Preliminary work on chemical weed control was also carried out in onions, lima beans and carrots.

1581. SWEET, R. D., AND OTHERS.

The response of several vegetables to stem-sprays with several herbicides.

Proc. N.E. States Weed Control Conf., New York, 1950, pp. 148-54.

From preliminary studies with several vegetables it appears that chemical weeding by means of stem sprays with any one of several herbicides is feasible. Considerable work needs to be done, however, to determine proper dosages, timing, best chemicals, crop tolerances, etc. [Authors' summary.]—Cornell University, Ithaca, N.Y.

1582. BRUNER, H. E.

The use of Sulfasan in the pre-emergence control of weeds in row crops.

Proc. 6th annu. Meet. N. centr. Weed Control Conf. 1949, Sioux Falls, S. Dak., pp. 80-1.

Results of 2 years' trials with peas, snap beans, soya beans, lima beans, sweet corn, cabbage and lettuce at the Ohio Agricultural Experiment Station, and commercial usage both indicate that an application of 2 gal. of Sulfasan (ethyl xanthogen disulphide) emulsified in 50 gal. of water to the acre, applied 1-2 days before emergence of the crop, gives excellent weed control without injury to the crops.

1583. SLIFE, F. W., AND OTHERS.

**Pre-emergence treatments with herbicides in field and truck crops.**

*Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 121-6.

Among the crops considered in 12 submitted abstracts were field and canning peas, castor beans and sunflowers. Chemicals used in the various tests included different forms of 2,4-D, granular cyanamide, XP-40A, Dow Selective, Sinox general, K-1131, Sinox W, IPC, sodium pentachlorophenate, Sulfasan, TCA and pentachlorophenol in oil. Adverse weather and soil conditions appeared to be limiting factors in pre-emergence weed control.

1584. ALBAN, E. K., AND OTHERS.

**The use of herbicides in horticultural, truck crops and potatoes. Vegetable crops.**

*Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 127-33.

Abstracts given include six reports on onions, two on potatoes and one each on sweet corn, snap beans, peas, tomatoes, carrots, beets, radishes, spinach, and lettuce. The chemicals included in these studies were 2,4-D, Aerocyanate, Aero-cyanamid, aromatic oils, pentachlorophenol, sodium pentachlorophenate, sodium isopropyl xanthate, sodium tri-chloroacetate, isopropyl N phenyl carbamate, methoxone, Exp. Herb. No. 1, NIX, and the ammonium salt of dinitro o sec butylphenol.

1585. LeCOMPTE, S. B., Jr.

**Experiments with potassium cyanate and calcium cyanamid on New Jersey asparagus, 1949.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 111-26, bibl. 4.

Various trials of chemical weeding of asparagus are described: 1. Preliminary experiments with potassium cyanate, 1%, 2% and 2% with wetting agent Vatsol K for chemical weeding of asparagus seedlings. 2. Preliminary experiments with potassium cyanate, 2% with and without Vatsol K for chemical weeding of asparagus during the cutting season. 3. Continuation experiments with potassium cyanate for weed control in asparagus brush. 4. Preliminary experiments on effect of granular calcium cyanamide on yield and quality of asparagus during cutting. [Author's summary.]

1586. COLE, C. E., DOERY, A. C., AND McALPIN, D. M.

**Weed control in carrot crops.**

*J. Dep. Agric. Vict.*, 1950, 48: 549-52, illus.

The recommendations given are: Control the weeds as much as possible by cultivation; destroy the remaining weeds by spraying with a specially prepared kerosene used neat; spray when the carrots are in the 1 to 4 "fern leaf" stage and avoid later spraying; do not spray the same crop twice and do not spray in very hot weather; use a fine misty spray.

1587. BUCHHOLTZ, K. P., AND OTHERS.

**Use of herbicides on seedling and established legumes.**

*Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 91-7.

Thirteen abstracts are given of trials on weed control in

legumes, two relating to trials in canning peas in Wisconsin. Herbicides of the growth substance type were used and the results were generally good. No reduction in yield of shelled peas followed the use of  $\frac{1}{4}$  lb. of the amine or sodium salt of 2,4-D. MCP and 2,4,5-T appeared more toxic to peas than 2,4-D. Ester preparations caused more severe injury than the other preparations.

1588. DEARBORN, C. H.

**Chemical control of wild mustard in canning peas and its effect on productivity.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 160-4, bibl. 3, being *J. Pap. N.Y. St. agric. Exp. Stat.* 808.

The results of studies described here show that mustard can be satisfactorily controlled in canning peas in New York with Dow Selective weed killer, Aero Cyanate, Aero Cyanamid, sodium chloride or sodium chloride plus sodium nitrate without adversely affecting the yield of shelled peas.

1589. SMITH, O., MARSHALL, E. R., AND MEADOWS, M. W.

**Chemical weed control in potatoes.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 165-9, being *Pap. Dep. Veg. Crops, Cornell Univ.* 328.

1. Pre-emergence application of 2,4-D at rates of 1 to 2 lb. to the acre afforded excellent control of broadleaved weeds in potatoes with no decrease in yields. 2. Pentachlorophenol, sodium pentachlorophenate and several forms of the dinitro compounds controlled weeds to a high degree when applied either alone or in combination with other materials such as HAN 132, 2,4-D or diesel oil. 3. Several other chemicals resulted in good control of weeds but also decreased the yields of potatoes. This was particularly true of sodium trichloroacetate and ammonium thiocyanate. [From authors' summary.]

1590. ELLISON, J. H., AND JACOB, W. C.

**Weed control in potatoes on Long Island.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 170-4.

The object of this study, conducted at the Long Island Vegetable Research Farm, Riverhead, N.Y., was to test several chemicals, each at 3 rates, to determine their relative merits as pre-emergence herbicides in potatoes, with and without a post-emergence oil spray and with and without midseason cultivation. Sodium pentachlorophenate was the most effective chemical used. The most outstanding result of this experiment, however, seemed to be the significant difference in yields between cultivated and sprayed plots, the former producing 3 and 4 times the yield of the latter. A single midseason cultivation also produced a definite yield increase. No such marked differences between chemically weeded and normally cultivated potatoes were found in previous experiments and the possible causes are discussed.

1591. SMITH, O., MEADOWS, M. W., AND MARSHALL, E. R.

**Relation of chemical weed control in potatoes to other production factors.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 175-9, being *Pap. Dep. Veg. Crops, Cornell Univ.* 329.



Results obtained in 3 localities in New York State indicate that potatoes weeded with Sinox General produced on the whole heavier crops than wheel-hoed plots. Spacings between rows of 11½ and 17 inches resulted in higher yields than 34-inch spacing. Increasing the rates of 5-10-5 fertilizer increased the yield of No. 1 grade potatoes but not total yields.

1592. DEARBORN, C. H.

Effect on sweet corn productivity of 4 compounds of 2,4-D sprayed post emergence above or below the corn foliage.

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 133-5, bibl. 2, being *J. Pap. N.Y. St. agric. Exp. Stat.* 809.

A uniform yield was obtained when sweet corn was weeded with the equivalent of ¾ lb. of 2,4-D acid in 13.7 gal. water per acre in 4 different formulations when these were applied when the corn was about 2 feet high. Sprays applied immediately after cultivation inhibited weed growth longer than the same concentration applied and mixed with the soil directly by the cultivator teeth.

1593. LACHMAN, W. H.

Weeding corn with chemicals II.\*

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 155-9, bibl. 8, being *Contr. Mass. agric. Exp. Stat.* 747.

Pre-emergence applications of 2,4-D produced seriously malformed [sweet] corn plants, and yields were reduced significantly with a 3.0 lb. application of this material. A 400 lb. application of granular cyanamid and 5.0 and 10.0 lb. applications of XP-40A were not effective in controlling weeds. Sodium pentachlorophenate, DNOSBP [dinitro-o-sec-butylphenol] and the ammonium salt of DNOSBP were very effective pre-emergence herbicides. Results of this investigation indicate that about 20 lb. of sodium pentachlorophenate applied soon after planting was the most effective treatment under test. It appears that this technique deserves considerable attention in planning further investigation concerned with weed control practices in corn. [Author's summary.]

*Weed control in fruit crops.*

(See also 2166.)

1594. VIEHMEYER, G.

Investigation of weed control methods in small fruits.

*Proc. 6th annu. Meet. N. centr. Weed Control Conf.* 1949, Sioux Falls, S. Dak., p. 78.

Data from various sources suggest that 2,4-D and IPC can be used to control weeds in strawberries, that TCA causes serious injury to raspberries, and that 2,4,5-T is more effective than 2,4-D for the eradication of poison ivy and horse nettle in orchards.

1595. GILBERT, F. A., AND WOLF, D. E.

Effects of some herbicides on strawberry plants of various varieties.

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 127-9.

A brief report is given on trials conducted at the New

\* For Part I, see *Proc. Amer. Soc. hort. Sci.*, 1949, 54: 417-28; *H.A.*, 20: 1580.

Jersey Agricultural Experiment Station from which the authors draw the following conclusions: The triethanolamine salt of 2,4-D should not be applied during the autumn when fruit buds are actively differentiating. Severe injury to strawberries may result from 2,4-D applications during extended drought periods. Some varieties are more resistant to 2,4-D than others. Sodium 2,4-dichlorophenoxy ethyl sulphate was found to be a very desirable weed control material for strawberries in two preliminary trials.

1596. HALLEMANS, A.

Over de bruikbaarheid van 2,4-D en M.C.P.A.-hormonen als selectieve onkruid-verdelgers in aardbeiercelen. (Using 2,4-D and MCPA hormones as selective weed-killers in strawberry plots.)

*Cult. Hand.*, 1950, 16: 548.

These hormones can be used as herbicides on strawberry plots with little risk of damage to the strawberry plants themselves, if applied after the fruit is picked, in August or September. The amounts recommended are: (a) commercial 2,4-D powder (80% sodium salt) at 1.5 kg. in 800-1,000 l. water per ha.; (b) soluble MCPA (12.5% sodium salt) 15 l. in 800-1,000 l. per ha.

*Weed control in tropical crops.*

(See also 2087, 2088.)

1597. VAN DER MEULEN, J. G. J.

Over onkruidbestrijding, meer speciaal met 2,4-D. (Weed control, with special reference to 2,4-D.)

*Landbouw*, 1950, 22: 123-40, bibl. 19.

Following a review of the uses of 2,4-D and of the results that have been obtained with this herbicide in other countries, the author discusses its possible application in Indonesia. He concludes that it is not likely to prove of value in the intensively worked, unmechanized domestic holdings, especially where annual crops are grown, nor, to any great extent, among plantation crops where selective weeding is commonly practised. Its chief use at present appears to be in the control of water hyacinth, a serious problem in the fishing and irrigation water of Indonesia. When agriculture becomes more mechanized, 2,4-D may have a wider application.

1598. VAN DE GOOR, G. A. W.

Onkruidbestrijding met behulp van synthetische groeistoffen. (Weed control with synthetic growth substances.) [English summary 1 p.]

*Landbouw*, 1950, 22: 141-81, bibl. 43, illus. English translation publ. as *Contr. gen. agric. Res. Stat.*, Bogor 108, pp. 45.

An account of the weed problems and common methods of control in Indonesia is followed by a discussion of the results of trials carried out there with 2,4-D on specific weeds and on weeds in agricultural crops, mainly rice and groundnuts.

1599. SMITH, O., ORSENIGO, J. R., AND GERTSCH, M. E.

Chemical weed control in coffee.

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 105-10.

In Costa Rica the usual methods of weed control in coffee plantings are laborious and expensive. As a result of trials with chemicals over 2 seasons, the following treatments are recommended for the control of weeds in coffee following "shovelling" (turning over the top inch or so of soil): (1) Sodium pentachlorophenate 4 lb., 2,4-D butyl ester acid equivalent 1 lb., heavy aromatic naphtha-132 5 gal., emulsifier 1 pt., water 95 gal. (2) Pentachlorophenol 4 lb., 2,4-D butyl ester acid equivalent 1 lb., heavy aromatic naphtha-132 10 gal., commercial diesel oil 25 gal. (3) Sinox General 2 pt., 2,4-D butyl ester, acid equivalent 1 lb., heavy aromatic naphtha-132 10 gal., water 90 gal. (4) Sodium isopropyl xanthate 10 lb., heavy aromatic naphtha-132 10 gal., emulsifier 1 pt., water 90 gal.

1600. McMARTIN, A.

**Further developments in chemical weed-killers.**

*Proc. S. Afr. Sugar Tech. Ass.*, reprinted in *S. Afr. Sugar J.*, 1950, 34: 471-5, bibl. 3.

Where oil sprays have been used dilute as emulsions, notably against grasses and nutgrass, they have only been effective where pentachlorophenol has been added. The mixture most commonly used in trials has been 4 gal. oil of high aromatic content, 2 lb. pentachlorophenol, 2 lb. wetting agent to 96 gal. water, 100 gal. being applied per acre. The addition of 2,4-D at 1 or 2 lb. acid equivalent per acre has given still better results, particularly against mixed weed populations. Cane is subject to damage by the oil, but this damage has been slight where the crop was tall enough to have trash forming on the lower joints. The use of 2,4-D as a pre-emergence spray just after the cane has been planted has also given very promising results. The effects of the sprays on certain individual weeds is indicated, and methods of application and probable costs are discussed.—Exp. Stat., Mount Edgecombe.

**Control of undesirable trees and shrubs.**

(See also 1603f, q, y, z.)

1601. BEATTY, R. H.

**Killing woody plants on a 12-month spray schedule.**

*Proc. 6th annu. Meet. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 53-4.

Spraying with 2,4-D plus 2,4,5-T in water or oil during the growing season is recommended. This should be followed during dormancy by cutting and spraying the stumps of those plants which are either too near to susceptible crops or are not accessible to mechanical equipment.

1602. MELANDER, L. W., AND OTHERS.

**Résumé of 1949 program made in research on eradication of woody plants.**

*Res. Rep. 6th annu. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 137-78.

From 34 abstracts submitted from the United States and Canada it appears that, for general bush spraying, mixtures of 2,4-D and 2,4,5-T are the most effective. Progress has been made in manufacturing new and more efficient proprietary formulations of 2,4-D and

2,4,5-T and combinations of the two. Additional work in this direction is, however, still desirable. Up to the present herbicides have been mostly applied as foliage sprays to growing plants, but experiments in progress now are designed to perfect techniques for applying 2,4-D and 2,4,5-T, alone or combined, at any season of the year. Extensive tables showing the reactions of woody plants to 2,4-D, 2,4,5-T and combinations of these two chemicals are included.

**Noted.**

1603.

a ALBAN, E. K., AND MCCOMBS, L.

**Pre- and post-emergence weed control with vegetable crops 1947-1949.**

*Proc. 6th annu. Meet. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 81-6.

Summaries of results obtained in Ohio with many herbicides.

b BENDER, E. K.

**Effects of chemical weed killers on sweet corn.**

*Suppl. Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 14-16, bibl. 2.

c CARLSON, R. F., AND MOULTON, J. E.

**Chickweed control in strawberries with IPC.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 102-4, bibl. 6.  
See *H.A.*, 20: 1583.

d CARLSON, R. F., MOULTON, J. E., AND HAMNER, C. L.

**Protection of strawberry plants with activated carbon in pre-planting applications with 2,4-D.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 130-2, bibl. 4.  
See *H.A.*, 21: 489.

e CHITTENDEN, D. B.

**Weed control on highways.**

*Proc. 6th annu. Meet. N. centr. Weed Control Conf. 1949*, Sioux Falls, S. Dak., pp. 34-5.

f COULTER, L. L.

**Recent developments in chemical brush control.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 246-9.

g DAVIS, G. E., AND SMITH, O.

**Physiological studies of the toxicity of 2,4-D.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 92-101.

h DeFRANCE, J. A., AND SIMMONS, J. A.

**Crabgrass control with PMAS on colonial bent putting-green turf and on seedling turf in lawns.**

*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 231-8, bibl. 4.



- i ENGEL, R. E., AND WOLF, D. E.  
Results of testing chemicals for crabgrass control in 1949.  
*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 239-42.
- j EVERIST, S. L.  
Hemlock declared a noxious weed.  
*Qd agric. J.*, 1950, 71: 295-7, illus.
- k GRAU, F. V.  
Biological and mechanical control of weeds in turf.  
*Suppl. Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 22-5.
- l HITCHCOCK, A. E., ZIMMERMAN, P. W., AND KIRKPATRICK, H., Jr.  
Practical control of water hyacinth with 2,4-D applied by helicopter and other equipment.  
*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 263-5, bibl. 2.  
For more detailed information, see *H.A.*, 21: 462.
- m KLINGMAN, G. C.  
Wild garlic and its control by 2,4-D.  
*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 180-9, bibl. 16.
- n KONDO, M., AND KASAHARA, Y.  
Studies on the germination of seeds of weeds, with special reference to the influence of light and the change of temperature on the germination. [Japanese.]—and
- o KONDO, M., AND KASAHARA, Y.  
Relation between the after-ripening of seeds as well as the change of temperature and the germination. [Japanese.]  
*Agron. Studies*, 1941, 32: 357-97, illus., and 398-408, respectively, from abstr. in *Jap. J. Bot.*, 1941, 11: (141) [received 1950].
- p MEEK, W. E.  
Some engineering developments in weed control.  
*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 13-20, plus illustration, pp. 8-10 in *Supplement*.
- q NEVILLE, H. B.  
The effectiveness of 2,4-D plus 2,4,5-T on poison ivy, horse nettle and certain shrubs.  
*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 259-60, bibl. 4.
- r NUTTER, E. C., AND CORNMANN, J. F.  
Experiments in crabgrass control with potassium cyanate.  
*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 225-30, bibl. 3.
- s PRYOR, D. K.  
Weed control on highways.  
*Proc. 6th annu. Meet. N. centr. Weed Control Conf.* 1949, Sioux Falls, S. Dak., pp. 35-6.
- t RALEIGH, S. M., AND PATTERSON, R. E.  
Apparatus for spraying small plots.  
*Suppl. Proc. N.E. States Weed Control Conf.*, New York, 1950, p. 13.
- u RALEIGH, S. M.  
Chemical control of wild garlic (*Allium vineale*).  
*Suppl. Proc. N.E. States Weed Control Conf.*, New York, 1950, p. 20.
- v RALEIGH, S. M.  
Chemical control of quack grass [*Agropyron repens*].  
*Suppl. Proc. N.E. States Weed Control Conf.*, New York, 1950, p. 21.
- w STAHLER, L. M.  
The national [American] picture in aerial spraying for weed control in 1949.  
*Proc. 6th annu. Meet. N. centr. Weed Control Conf.* 1949, Sioux Falls, S. Dak., pp. 37-41.
- x TERRY, C. W., AND OTHERS.  
Low-gallage directional-spray equipment for applying herbicides in row crops.  
*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 136-7.
- y THIMANN, K. V.  
Brush control in Cuba.  
*Suppl. Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 26-31, bibl. 5.  
With special reference to marabú (*Dichrostachys nutans*) [see also *H.A.*, 20: 1593].
- z VINTINNER, F. J.  
Experiments in ragweed and poison ivy control.  
*Proc. N.E. States Weed Control Conf.*, New York, 1950, pp. 276-80, bibl. 4.

## VEGETABLES, TEMPERATE, TROPICAL AND GLASSHOUSE.

*General.*

(See also 1246, 1272, 1278, 1280, 1281, 1288, 1294, 1303, 1312, 1316, 1324, 1325, 1343, 1399a, 1603a, e, 1725f, h, r, 2008, 2112, 2117, 2129, 2143, 2150.)

## 1604. NORTH, C.

Vegetable seed production in Holland.  
*Agriculture, Lond.*, 1951, 57: 531-4.

A brief account is given in which mention is made of

acreages and production centres, descriptive variety lists, the inspection service, methods of isolation and seed testing, and the breeding of new varieties.

## 1605. MULLER, C. J.

Better seeds for the horticultural industry.  
*Agriculture, Lond.*, 1950, 57: 426-9.

The need for the production of better seeds for horticultural crops is emphasized. The steps which should be taken to assist the control of pests and diseases, and

to obtain "the perfect sample", are outlined.—N.A.A.S.

1606. NOGUTI, Y., AND TAKI, K.

Stimulation induced by the exposure of seeds to carbon monoxide gas.

*Proc. imp. Acad.*, 1941, 16: 400-1, illus., from abstr. in *Jap. J. Bot.*, 1942, 12: (19) [received 1950].

The seeds of certain plants were exposed to the action of CO gas for 5-11 days. As a result of this treatment the growth of rice, cucumber, tomato and *Medicago sativa* seedlings was retarded. Abnormal elongation of stems and roots was induced in seedlings of maize, broad bean, lettuce and *Arctium lappa*, while in seedlings of radish, asparagus and *Brassica oleracea* elongation of either stem or root only occurred. In some cases the increased rate of growth continued in the later developmental stages.

1607. KORVEN, H. C.

Irrigating the prairie home garden.

*Publ. Canada Dep. Agric.* 851, 1950, pp. 21, illus.

Though primarily concerned with methods of irrigation by furrow and sprinkler, this publication briefly discusses cultivation and methods of maintaining soil fertility and lists the vegetable varieties recommended for south-western Saskatchewan.

1608. HILTON, R. J., AND GIFFEN, R. N.

Mulches for vegetable crops.

*Rep. Proc. west. Canad. Soc. Hort.*, Winnipeg, 1950, pp. 19-21, bibl. 5.

In preliminary trials at the University of Alberta with sawdust, asphalt paper and no mulch on tomatoes, peppers and cucumbers plants with paper mulch grew best. Temperatures were highest under the paper, but sawdust was more effective in conserving moisture. Plants grown with sawdust showed foliage symptoms of N deficiency.

1609. KASERER, H.

Bodendüngung — Pflanzendüngung — Samendüngung—Keimlingsdüngung. (Soil fertilizing—plant fertilizing—seed fertilizing—seedling fertilizing.)

*Z. PflErnähr. Düng.*, 1950, 50: 60-8, bibl. 9.

A further article about "Porro" [see *H.A.*, 18: 1583; 19: 1201 and 1258] with a brief history of the development of fertilizing methods. The use of this seed or seedling fertilizer not only helps germination and increases yields but also results in a more efficient and economic use of other fertilizers.

1610. SCHROPP, W.

Wasser- und Sandkulturversuche über die Wirkung der Spurenelemente im Chilesalpeter. (Water and sand culture experiments on the effect of trace elements in Chilean nitrate.)

*Z. PflErnähr. Düng.*, 1950, 50: 203-25, bibl. 9, illus.

In water and sand culture experiments at Weihestephana, Chilean nitrate gave superior results to synthetic sodium nitrate with spinach, carrots, sunflowers and crucifers, apparently owing to the presence of boron in the former. With cereals no differences were observed.

1611. HEWITT, E. J., AGARWALA, S. C., AND JONES, E. W.

Effect of molybdenum status on the ascorbic acid content of plants in sand culture.

*Nature*, 1950, 166: 1119-20, bibl. 13.

In the course of an investigation of possible means of nitrate or nitrite reduction in plants, it seemed of interest to determine whether molybdenum status influences the ascorbic acid content. The tabulated results, obtained with various crops (mainly vegetables) under controlled sand culture conditions, indicate that molybdenum deficiency causes a striking reduction in the apparent ascorbic acid content. Conversely, the injection of 200-400 µg. molybdenum over a period of 12-24 hrs. into petioles of molybdenum-deficient plants caused the ascorbic acid content to rise to double that of untreated controls. Molybdenum-deficient cauliflower plants given ascorbic acid in the nutrient showed fresh chlorophyll formation after about 7 days, followed by renewed growth. Several theories that offer themselves as an explanation of these results are discussed and further research is in progress to test their validity.—Long Ashton Research Station.

1612. PLANTENZIEKTENKUNDIGE DIENST, WAGENINGEN.

Beschadigingen, veroorzaakt door groeistoffen. (Injuries caused by growth substances.)

*Vlugschr. Minist. Landb.* 68, 1950, pp. 5, illus.

The injuries that may result from the use of growth substances at too high a concentration, or from spray drift reaching plants for which it was not intended, are described and illustrated by photographs of deformed leaves of potato, beetroot, apple, spinach, lettuce, cauliflower, vine and beans.

1613. MIDDLETON, J. T., KENDRICK, J. B., Jr., and SCHWALM, H. W.

Smog in the south coastal area of California.

Reprinted from *Calif. Agric.*, 11: 4: 7 as *Pap. Univ. Calif. Citrus Exp. Stat.* 640, undated, pp. 8, illus.

Injury to herbaceous plants in the Los Angeles area has resulted from air pollution by gases and aerosols. The types of damage caused to the leaves of various crops are illustrated. The following cultivated plants are listed in order of decreasing susceptibility: *extreme*, Romaine lettuce, endive, spinach; *moderate*, beet, celery, oats, Swiss chard, alfalfa; *slight*, barley, onion, parsley, radish, tomato, turnip, rhubarb; *none*, cabbage, cantaloupe, carrot, cauliflower, cucumber, pumpkin, squash, broccoli.

1614. RUDAKOV, K. I., STARYGINA, L. P., AND ŠIŠELOVA, N. A.

Soft rot of vegetables. [Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk* 1950, 15: 10: 25-8, bibl. 13.

The authors recognize two categories of organisms causing soft rot of vegetables: (1) the *Erwinia carotovora* group, and (2) sporing soil bacteria such as *Bacillus mesentericus*, *B. subtilis* and particularly *B. polymyxa*. Measures of control are discussed particularly with reference to cabbages grown for seed.



1615. STODDARD, E. M., AND ZENTMYER, G. A.

Control of damping-off with 8-quinolinol.

Plant Dis. Repr., 1950, 34: 236-7, bibl. 2.

In greenhouse experiments 8-quinolinol and its benzoate and sulphate salts applied dry, mixed with the soil, gave good control of pre- and post-emergence damping-off in spinach, peas, eggplant, lettuce, petunias, snapdragons, celery, tomatoes, and elms.

1616. PARKER, H. L., BERRY, P. A., AND SILVERIA, A.

Vegetable weevils and their natural enemies in Argentina and Uruguay.

Tech. Bull. U.S. Dep. Agric. 1016, 1950, pp. 28, bibl. 2, illus.

An account is given of the search for, and collection of, natural enemies of *Listeroderes* for introduction into the United States in an attempt to control the vegetable weevil, *L. costirostris* var. *obliquus* Klug. *Porison parkeri*, *Triaspis* n.sp., *Epiplagiops littoralis*, and *Microctonus* n.sp. are described in detail and illustrated.

1617. WAITE AGRICULTURAL RESEARCH INSTITUTE, DEPARTMENT OF ENTOMOLOGY.

The climbing cutworm moth in South Australia.

J. Dep. Agric. S. Aust., 1950, 54: 184-9, bibl. 7, illus.

The climbing cutworm (*Heliothis armigera*) is one of the most destructive agricultural pests in South Australia. It feeds on the buds, developing fruits, and seed heads of many cultivated plants, and on a variety of weeds and native plants also. It is best known for its damage to peas, linseed, and tomatoes. Its various names, its economic importance and food plants, distribution, life history, seasonal fluctuation and control by cultural methods and by insecticides (particularly DDT) are described.

1618. CAMERON, E.

The biology and economic importance of *Alomya debellator* (F.) a remarkable parasite of the swift moth *Hepialus lupulinus* (L.).

Bull. ent. Res., 1950, 41: 429-38, bibl. 10, illus.

The larvae of *Hepialus lupulinus* attack a great variety of crops, including potatoes, parsnips, carrots, lettuce, strawberries, iris, narcissus and other bulbs, peonies and dahlias, while *H. humuli* is often a serious pest of hops. As chemical control of subterranean insects is exceedingly difficult, importance must be attached to the ichneumonid parasite *Alomya debellator*, which helps to keep the pest in check in southern England. The potential value of the parasite as a factor in the control of *H. lupulinus* in Australia is discussed.

1619. PIPER, A.

Full use of standard returnable lettuce and cauliflower crates.

Agriculture, Lond., 1951, 57: 481-3, illus.

An account is given of how to make full use of standard-sized lettuce and cauliflower crates when not employed for their special purpose. The lettuce crate can be used for early carrots, selected washed carrots without tops, very early peas, early broad beans, French beans, stick beans and early marrows, and as a punnet carrier for selected soft fruit. The standard returnable

cauliflower crate with lid can be used for best grade cabbage, bunched carrots, broccoli, early cauliflower, bunched beetroot, marrows, rhubarb, and as a punnet or chip carrier for soft fruit.

1620. NILSSON, R.

Försök med grönsakstransporter per järnväg, särskilt med hänsyn till olika vagnstypers användbarhet, utförda av lagringsforskningskommittén inom Jordbrukets forskningsråd sommaren 1949. (The transport of vegetables by railway with special reference to the type of truck.) [English summary  $\frac{1}{2}$  p.]

J. roy. Swedish Acad. Agric., 1950, 89: 78-86.

Trials with various types of truck for the transport of vegetables from southern to northern Sweden, carried out in the summer of 1949, included (1) an ordinary truck, (2) an insulated truck cooled by ice, and (3) a refrigerated truck. The temperature was highest in (1) and lowest in (3). Spinach and lettuce carried best in (3), having one or two days' longer shelf life than lots transported in (1) or (2). Weight loss in transit was smallest in (2) and highest in (3), owing presumably to moisture absorption by the coils. The investigation also showed the need for precooling vegetables prior to long-distance transport.

*Asparagus.*

(See also 1459, 1579, 1580, 1585.)

1621. REINECKE, V.

Asparagus.

Fmg S. Afr., 1951, 26: 4-5.

An account of growing asparagus under South African conditions, with notes on cultural requirements, planting, cultivation and marketing. The varieties grown in the Union at present are the Washington varieties. Other improved varieties would do equally well.—Div. Hort., Pretoria.

1622. GHISLENI, P. L.

Osservazioni sul primo sviluppo dell'apparato radicale dell'asparago (*Asparagus officinalis* L.). (Observation on the primary development of the root system of asparagus.) [Summaries in English, French and German  $\frac{1}{2}$  p. each.]

Nuovo G. bot. ital., 1949, 56: 612-27, bibl. 13, illus.

In coarse-textured soil at pH 7.15 the primary roots of asparagus began to disappear 45 days after germination and were quite lost from all the plants in 75 days. In fine-textured soil at pH 6.9 the corresponding periods were 40 and 70 days.

*Brassicas.*

(See also 1459, 1612, 1614, 1619, 1725g, k, m, 2159, 2161.)

1623. NILES, J. J.

Some notes on the cultivation of cabbage.

Trop. Agriculturist, 1949, 105: 26-8 [received 1951].

Three aspects of the cultivation of the common cabbage at Nuwara Eliya (elevation 6,170 ft.) are discussed:

(1) the use of suckers or seed for propagation, the former being the more commonly used; (2) the effects of strong wind and frosts at certain seasons; and (3) cut-worm infestation, for the prevention of which open cigarette tin collars and a decoction made from the leaves of *Lobelia nicotianaefolia* have both been found effective.

1624. RALEIGH, G. J.

**Molybdenum deficiency in Dunkirk silty clay loam.**

*Science*, 1950, 112: 433-4, bibl. 7.

Molybdenum deficiency was confirmed as the cause of whiptail symptoms in cauliflower growing near Ithaca, New York. Plants grown in drums containing soil from the affected area responded to ammonium molybdate applied at a rate of 1 lb. per acre.

1625. POLJAKOVA, N. F.

**The fungus *Botrytis* and its rôle in the loss of seed cabbage.** [Russian.]

*Sad i Ogorod* (Orchard and garden), 1950, No. 10, pp. 66-8, illus.

Studies made at Novočerkask indicate that heavy losses of cabbage kept in storage for next year's seed crop were caused by *Botrytis* [cinerea]. Improved storage conditions, whether indoors, in trenches or in clamps, at a temperature of 0° C., and destruction of infected plants are suggested for control.

1626. PEREZ, R.

**Les insectes parasites des crucifères maraichères: moyens de lutte. (Insect pests of garden crucifers and their control.)**

*Rev. hort. Paris*, 1950, 122: 250-5, illus.

Root, stem and leaf pests are dealt with, notes being given on the damage caused, biology of the insect and its control. The information is summarized in a table.

1627. MILES, M.

**Observations on the biology and control of cabbage root fly, *Erioischia brassicae* (Bché).**

*Ann. appl. Biol.*, 1950, 37: 260-7, bibl. 7.

The egg-laying of *Erioischia brassicae* was at its maximum in the last week of April and first week of May and the eggs were laid mostly on the soil with only small numbers on the plant. Larvae were found at the roots of brassica crops from the end of April to mid-January. Many growers use a 4% mercurous chloride (calomel) dust at the time of planting. This dust at 80 lb. per acre was compared, on a crop of brussels sprouts, with BHC prepared as flea beetle and wireworm dusts at 40 lb. per acre. BHC in wireworm dust was as effective as calomel dust, but the concentration of BHC in flea beetle dust was insufficient to give as good a control as the calomel dust. The calomel dust was quite stable, maintaining its efficiency from 2 July to 30 August when the last observation was made. It is considered that the often recommended second application may be unnecessary.—Wye College. C.W.S.H.

1628. STOLZE, K. V., AND HILLEMANN, H.

**Weitere Mitteilungen über Versuche zur Vereinfachung der Kohlfliegenbekämpfung. (A further communication on trials designed to simplify the control of cabbage flies.)**

*NachrBl. dtsh. PflSchDienst., Braunschweig*, 1950, 2: 180-2, bibl. 3, illus.

Results of 3 years' experiments have shown that an application of 0.2-0.4 g. per pot or 1-2 kg. per cu. m. soil of E605 dust or Streunex gave an effective control of cabbage flies on cauliflowers.

1629. FREY, W.

**Zur Frage der Brauchbarkeit neuerer Kontaktinsektizide zur Bekämpfung der verschiedenen Raupenstadien des Kohlweisslings (*Pieris brassicae* L.). (The use of newer contact insecticides for the control of larvae of the cabbage white butterfly.)**

*NachrBl. dtsh. PflSchDienst., Braunschweig*, 1950, 2: 168-70.

The effectiveness of DDT, BHC and phosphoric acid ester preparations was tested in laboratory trials on the 5 larval stages of cabbage white butterfly, classified for this purpose into 3 groups. The tabulated results show that all the chemicals gave good control of the youngest stages; their effectiveness, however, decreased as the larvae developed. For an overall larval control the phosphoric acid ester preparations seemed to be the most effective and BHC the least.

### Celery

1630. DAVIS, J. F.

**Effect of rate of application of fertilizer and spacing of plants on the performance of Cornell 19 and Utah 15 celery varieties.**

*Quart. Bull. Mich. agric. Exp. Stat.*, 1950, 33: 106-10, bibl. 2, illus.

Yields of celery produced on plots receiving 2,500 lb. of 0-10-30 fertilizer per acre ranged from 4 to 5.7 tons per acre higher than those of plots on which 1,500 lb. were applied. Lower yields and a higher percentage of trimmings were associated with wider spacings. In general, the weight per stalk increased with wider spacing and with increased rate of fertilizer within the limits of this experiment.

1631. VERBRUGGEN, A.

**Enkele belangrijke selderieziekten en hun bestrijding. (Important diseases of celery and their control.)**

*Cult. Hand.*, 1950, 16: 484-5.

The diseases described are leaf spot (*Septoria apii*), rust (*Puccinia apii*), celeriac scab (*Phoma apicolica*), bacterial rot [*Bacterium carotovorum*], virus disease (*Apium virus I*), downy mildew (*Peronospora nivea*) and boron deficiency.

### Cucurbits.

(See also 1327, 1551, 1579, 1608, 1685.)

1632. ROSS, A. A.

**Cucumbers, rockmelons and related crops.**

*Qd agric. J.*, 1950, 71: 255-64, illus.

The article describes soils, planting, manures, cultivation, irrigation, harvesting and varieties for the following cucurbits in Queensland: cucumbers, rockmelons, watermelons, pumpkins, marrows, squash and choko.

1633. OGNEV, I. M.

**To expand the cultivation of loose-seeded pumpkin.** [Russian.]

*Sad i Ogorod* (Orchard and garden), 1950, No. 10, pp. 64-6, illus.



After 2 years of testing on 7 locations, the pumpkin variety White Russian 24-G is now recommended for cultivation. This pumpkin yields well, and the fat content of its seeds is high and of good quality; the flesh is suitable for table and fodder purposes.

1634. KOLIŠČUK, L. K.

The dynamics of the chlorophyll content in pumpkins grown under low temperatures. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 70: 529-32, bibl. 10.

The chlorophyll content of pumpkin leaves gradually increases with age, reaches a maximum when the plants are of medium development, remains almost constant for some time, and then begins to decrease. In old plants a low chlorophyll content in the leaves is accompanied by an increased combination of pigment and protein. At low temperatures (below 15-14° C.) pumpkin leaves turn dark. At still lower temperatures (7-6° C.) there is a decrease in the chlorophyll content of the whole plant. In pumpkin plants grown from seed sown in the second half of summer, and also in plants raised in a warm frame, no increase in chlorophyll content has been observed with low temperature.

1635. WALKER, J. C.

Environment and host resistance in relation to cucumber scab.

*Phytopathology*, 1950, 40: 1094-1102, bibl. 10, illus.

Cucumber scab (*Cladosporium cucumerinum*) occurs in epidemic form in Wisconsin in areas where cool weather, with frequent night fogs, prevails after midseason, the optimum temperature for disease development being about 17° C. Under optimum environment, penetration of the resistant variety Maine 2 occurs and delimited local lesions develop without the rapid stem invasion which prevails in susceptible varieties. The resistance of Maine 2 and the susceptibility of other varieties are controlled by a single gene pair.

1636. GODFREY, G. H.

Powdery mildew control [in cantaloupes].

*Seed World*, 1950, 67: 8: 41.

Experiments conducted in the spring of 1950 by the Texas Lower Rio Grande Experiment Station showed that a new fungicide, Karathane (dinitro capryl phenyl crotonate), was very effective in checking the disease without injury to the plants.

1637. IWATA, Y.

Specialization in *Peronospora cubensis* (Berk. et Curt.) Rostow. (1) Comparative studies on the pathogenicities of the fungi from *Cucumis sativus* L. and *Cucurbita moschata* Duchesne. [Japanese, English summary.]

*Ann. phytopath. Soc. Japan*, 1941, 11: 101-13, illus., from abstr. in *Jap. J. Bot.*, 1942, 12: (8) [received 1950].

It was observed that a field of squash (*Cucurbita moschata*) remained quite free from downy mildew (*Peronospora cubensis*) even though a neighbouring field of cucumbers was heavily infected. Artificial infection of the squash plants with fungus from the

cucumbers, and *vice versa*, gave negative results. These observations suggest the existence of different physiological strains of the fungus.

1638. MICHELBACHER, A. E., AND MIDDLEKAUFF, W. W.

Control of the melon aphid in northern California.

*J. econ. Ent.*, 1950, 43: 444-7.

Of the materials tested against a heavy infestation of melon aphid, *Aphis gossypii*, in 1949 a 2% parathion dust resulted in the highest initial kill and best control. Next in effectiveness was a 1% tetraethyl pyrophosphate dust followed by a 4% nicotine dust. The best treatment, however, rarely remained effective for more than 3 weeks, and it was found that both parathion and tetraethyl pyrophosphate adversely affected predatory insects. Studies have also shown that, with carefully timed applications, it is possible to use 3% DDT dust at 30 lb. per acre to control *Diabrotica* beetles and leafhoppers without seriously affecting aphid predators.

1639. HOWE, W. L.

Biology and host relationships of the squash vine borer.

*J. econ. Ent.*, 1950, 43: 480-3, bibl. 16, being *J. Pap. N.Y. St. agric. Exp. Stat.* 824.

None of the first instar larvae of the squash borer, *Melittia cucurbitae*, introduced into the stems of fruits of cucumber, musk melon and watermelon survived.—*N.Y. agric. Exp. Stat.*, Geneva.

1640. HOWE, W. L.

Reactions of the squash vine borer to certain insecticidal soil treatments.

*J. econ. Ent.*, 1950, 43: 549-50, being *J. Pap. N.Y. St. agric. Exp. Stat.* 825.

While benzene hexachloride, lindane and possibly dieldrin soil applications greatly reduced infestation by the squash vine borer, *Melittia cucurbitae*, their value for control appears to be doubtful, owing to the risk of causing off-flavours in the fruit.

## Legumes.

(See also 1260, 1261, 1262, 1267, 1282, 1292, 1299, 1300, 1305, 1311, 1315, 1331 I, q, 1459, 1513, 1530, 1548, 1579, 1580, 1582, 1583, 1584, 1587, 1588, 1612, 1617, 1771, 2007, 2158, 2159, 2168.)

1641. PATEL, G. A.

Double bean.

*Poona agric. Coll. Mag.*, 1950, 41: 211-15.

Notes are supplied on the climbing Double bean, *Phaseolus lunatus macrocarpus*, and its cultivation and harvesting in Bombay state, with tabulated details of costs of production.

1642. SREENIVASAN, A., AND WANDREKAR, S. D.

Biosynthesis of vitamin C during germination. I. Effect of various environmental and cultural factors.

*Proc. Indian Acad. Sci., Sect. B*, 1950, 32: 143-63, bibl. 30.

Mung beans (*Phaseolus radiatus*), Bengal gram (*Cicer arietinum*), peas (*Pisum arvense*), masoor [lentils]

(*Lens esculenta*) and matki (*Phaseolus aconitifolius*) were used in a series of experiments, in which the seeds were soaked in various solutions before being germinated in Petri dishes lined with absorbent cotton wads. Samples of the germinated plants were analysed for ascorbic acid at different stages of growth. Treatment with sulphates of either Mn or Mg did not affect ascorbic acid or dehydroascorbic acid formation, but boric acid slightly enhanced ascorbic acid synthesis. Treatment with salts of N, P or K, with  $\alpha$ -naphthylacetic acid or  $\beta$ -indolylacetic acid, or with colchicine, markedly reduced ascorbic acid formation in the early stages of growth. Treatment by steeping the seed in cold water and by germination in the dark both resulted in pronounced increases in the biosynthesis of ascorbic acid, the latter being relatively the more effective. Where germination in the dark followed the cold treatment a further increase in ascorbic acid resulted. The addition of hexoses to nutrient media increased ascorbic acid from sugars, but attempts to elaborate ascorbic acid from sugars through the growth of micro-organisms were unsuccessful.

1643. POLUNIN, JA. JA.  
**Vegetative hybridization of peas.** [Russian.] *Agrobiologija* (Agrobiology), 1950, No. 5, pp. 94-103, illus.

The characters of seeds from a number of vegetatively produced hybrids (obtained by grafting certain varieties on others) of peas, are described and some of them illustrated.

1644. OLSSON, A.  
Inverkan av utsådens ålder och mognadsgrad på skördeutbyte och kvalitet hos vissa lantbruksväxter. (The effect of age and maturity of pea seed on yield and quality of the resulting crop.) [English summary  $\frac{1}{2}$  p.] *J. roy. Swedish Acad. Agric.*, 1950, 89: 241-61, bibl. 3.

Pea seed harvested before full maturity tended to produce a crop that does not ripen fully, especially in cold and wet summers or in northern regions with a short growing season. As after-ripening takes place in storage, 3-4-year-old seed gave better results than fresh seed harvested not fully ripe. In the yellow pea variety Torsdagsårt II, which was used in these trials, the largest seeds had attained the fullest maturity. Unripe seed was found to yield more vigorous plants and might therefore be used to advantage for a green forage crop. The results reported are considered as preliminary, and further experiments embracing other crops are contemplated.

1645. ODLAND, M. L.  
**Influence of plant spacing on yield of snap beans.** *Progr. Rep. Pa agric. Exp. Stat.* 38, 1950, pp. 4, bibl. 4, illus.

The 6 varieties of snap bean used in these tests responded to spacing in a similar way. With rows 3 ft. apart, the maximum yield was obtained when the spacing in the rows was in the range of 1-2½ in. A 2-in. spacing will require approximately 75 lb. seed per acre. Quantities of seed required per acre for the 6 varieties at different spacings are tabulated. Taking into

consideration the price of seed, a 3-in. spacing is considered to be the most practical.

1646. BRINDLEY, T. A., SCHOPP, R., AND HINMAN, F. G.  
**Effect of initial high dosages of DDT on the yields of peas and wheat.**

*J. econ. Ent.*, 1950, 43: 565-7, bibl. 4, illus., being *Res. Pap. Idaho agric. Exp. Stat.* 308.

An 80 lb. per acre application of DDT to a loam soil reduced the yields of Thomas Laxton and Alaska peas during the first, second and third crop seasons after treatment. Rex winter wheat grown during the second season was unaffected. This dosage, however, was far in excess of any concentration of DDT that would accumulate from applications of DDT insecticides for the control of pea insects.

1647. CHAUDHURI, R. P.  
**Studies on two aphid-transmitted viruses of leguminous crops.**

*Ann. appl. Biol.*, 1950, 37: 342-54, bibl. 15.

Transmission studies are described in which test plants included, among others, pea, broad bean, French bean, sweet pea, and Russell lupin. Pea mosaic virus was transmitted by *Myzus persicae* Sulz., *Macrosiphum pisi* Kalt., *M. solanifolii* Ash. and *Aphis fabae* Scop., but not by *Hyperomyzus staphyleae* Koch. Pea enation mosaic persisted in *Myzus persicae* and *Macrosiphum pisi* for over 140 hours.—Rothamsted exp. Stat.

1648. QUANTZ, L.  
Beobachtungen zur Samenübertragbarkeit eines Mosaik-virus der Ackerbohne (*Vicia faba* L.). (Observations on seed transmission of a mosaic virus of broad beans.) *Nachr. dt. PflSchDienst., Braunschweig*, 1950, 2: 172-3, bibl. 4, illus.

To the controversy as to whether the mosaic disease of broad beans is seed-transmissible or not, the author adds the results of his own experiments which show clearly that the disease was transmitted by seed.

1649. WARK, D. C.  
**The inheritance of resistance to *Ascochyta pisi* Lib. in *Pisum sativum* L.** *Aust. J. agric. Res.*, 1950, 1: 382-90, bibl. 4, illus.

The *Ascochyta pisi* disease of peas is described. Over 200 varieties and strains of peas were tested for susceptibility. Austrian Winter was the least susceptible variety tested and when it was crossed with other varieties the  $F_1$  generation was as resistant as Austrian Winter in all cases except one. Segregation in the  $F_2$  and later generations was such as to indicate that the resistance is due to a combination of three Mendelian factors, all of which are dominant. The resistant hybrids have all inherited some undesirable qualities from the Austrian Winter parent.

1650. WALLEN, V. R., AND SKOLKO, A. J.  
**Antibiotic XG as a seed treatment for the control of leaf and pod spot of peas caused by *Ascochyta pisi*.** *Canad. J. Res., Sect. C*, 1950, 28: 623-36, bibl. 26, being *Contr. Div. Bot. Plant Path., Sci. Serv., Dep. Agric. Ottawa* 1046.



In Canada the prevention of ascochyta blight of peas has been based mainly on the introduction of disease-free seed from the semi-arid areas of the western United States, as chemical seed treatment is unsuccessful and resistant varieties do not exist. In an investigation on the use of antibiotics for the control of the disease, Antibiotic XG, a metabolic product of an organism closely related to *Bacillus subtilis*, was selected for further study and the following results are reported: The soaking of diseased pea seed samples in Antibiotic XG at a concentration of 25 p.p.m. for a period of 18 hrs. effectively controls *A. pisi* infection as determined by laboratory test and does not seriously impair germination. This treatment is compatible with Spergon applied after the seed has been air-dried. Storage of treated seed for a period of three months did not affect the degree of control but reduced the germinative capacity in laboratory plate tests.

1651. BOCKMANN, H.  
Über Fusskrankheiten an Erbsen. (Foot rot of peas.)  
*Z. PflKrankh.*, 1950, 57: 327-34, bibl. 3, illus.

The term "foot rot" of peas has been applied to more than one disease. The author suggests that it should be used only for stem and root rot caused by *Rhizoctonia solani* K.

1652. CRUICKSHANK, I. A. M.  
Studies on a fungus (*Septoria pisi* Westend.) causing a foliage disease of peas (*Pisum sativum* L.).  
*N.Z. J. Sci. Tech. Sect. A*, 1949 (published Oct. 1950), 31: 3: 17-23, bibl. 13, illus.

Septoria blotch of peas is recorded on both field and garden peas throughout New Zealand. It is seen as light brown amorphous broad irregular lesions on stems and leaves. The morphological and cultural characters of the fungus are described.

1653. EDWARDS, G. R.  
Insect pests of vegetable crops. Section III.  
Insect pests of beans.  
*J. Dep. Agric. S. Aust.*, 1950, 54: 68-73, illus.

Descriptions with notes on control of the green vegetable bug (*Nezara viridula*), red spider (*Tetranychus urticae*), bean seed weevil (*Bruchus obtectus*), bean butterfly (*Zizeeria labradus*), bean aphids (*Aphis* spp.), thrips (*Thysanoptera*), white flies (*Trialeurodes vaporariorum*), red-legged earth mites (*Halotydeus destructor*), and lucerne flea (*Smynturus viridis*).

1654. EDWARDS, G. R.  
Insect pests of vegetable crops. Section IV.  
Insect pests of peas.  
*J. Dep. Agric. S. Aust.*, 1950, 54: 195-9, illus.

The habits, life cycles and control are described for the red-legged earth mite (*Halotydeus destructor*), the pea mite or blue oat mite (*Penthaleus major*), lucerne flea (*Smynturus viridis*), thrips [*? Kakothrips pisivorus*], and the heliothis caterpillar or climbing cutworm (*Heliothis armigera*).

1655. JOHNSON, C. G.  
Infestation of a bean field by *Aphis fabae* Scop. in relation to wind direction.  
*Ann. appl. Biol.*, 1950, 37: 441-50, bibl. 1, illus.

Wind direction was shown to have been an important factor in the infestation of a bean field, though other unassessed factors were involved.—Rothamsted exp. Stat.

C.W.S.H.

1656. SMITH, C. F.  
Pea aphid control in North Carolina.  
*Special Circ. N.C. agric. Exp. Stat.* 7, 1948, pp. 5, illus. [received 1951].

May peas should not be grown near fields of susceptible crops. Very good control of the aphid has been obtained with a dust containing 5% DDT, and rotenone (0.75%) has given fair control. Benzene hexachloride has given good control but should not be used because of the danger of "off flavour".

1657. TSI, C. S.  
Protection against aphids by seed treatment.  
*Nature*, 1950, 166: 909-10, bibl. 3.

In laboratory trials carried out at Jealott's Hill Research Station, Bracknell, Berks., soaking the seeds of cotton, pea, bean (broad and other), and nasturtium in aqueous solutions containing 0.016 to 0.5% bis(bisdimethylamino phosphonous anhydride) prevented the establishment of aphids and red spider on the plants for over 50 days. Drying the seed after soaking did not affect the insecticidal properties at subsequent planting. A 1% solution had no phytotoxic effect, but 2% proved injurious to all test plants, with the exception of nasturtium which tolerates up to 5%. Some experiments with aphids confined on individual leaves showed that toxicity is first lost among the younger leaves at the top. It is thought that the treatment may have practical application in the control of aphids and other insects, provided the seed is large enough to allow for the absorption of sufficient of the active principle.

1658. HASE, A.  
Zur Geschichte der Einbürgerung des Speisebohnenkäfers und deren praktische Folgen. (The history of the acclimatization of the bean weevil and its practical consequence.)  
*NachrBl. dtsch. PflSchDienst, Berlin*, 1950, 4: 181-5, bibl. 25.

The literature is reviewed on the bean weevil (*Acanthoscelides obsoletus*), which is now considered to be a serious pest of beans in Germany, though hitherto not regarded as of importance.

1659. VOLKOV, A. N., AND ČUDINOVA, A. N.  
Chemical control of the bean seed weevil in the store. [Russian.]  
*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1950, 15: 9: 36-41.

Some of the newer insecticides, e.g. paradichlorobenzol, hexachlorethane, naphthalene and AAT, have been found to be effective for treating seeds infested with the bean weevil [*Bruchus obtectus*] in the store.

**Mushrooms.**

(See also 2125, 2152, 2190.)

1660. NISIKADO, Y., KIMURA, K., AND MIYAWAKI, Y.

Fundamental studies on the artificial propagation of *Armillaria matsutake* II. On the pure culture and isolation of the mycelia of *Armillaria matsutake*. [Japanese.] *Agron. Studies*, 32: 442-51, illus.

IBID.

Studies on the principles of growing Japanese Matsutake artificially II. On the isolation of the mycelium of pure culture.

*Ber. Ohara Inst. Landw. Forsch.*, 1941, 8: 443-53, illus., both from abstr. in *Jap. J. Bot.*, 1941, 11: (148)-(149) [received 1950].

The authors have succeeded in obtaining pure cultures of *Armillaria matsutake*, one of the most important edible mushrooms in Japan, from part of the sporophore or from the soil. Their method is described in detail. Pure cultures obtained in this way grow much more quickly than those derived from the spore, and the technique may therefore be of practical value.

1661. HAXO, F.

Carotenoids of the mushroom *Cantharellus cinnabarinus*.

*Bot. Gaz.*, 1950, 112: 228-32, bibl. 9.

A description is given of the chromatographic method used for separating the pigments from extracts of *Cantharellus cinnabarinus*. The major component, obtained from the deep red zone, was a non-acidic, oxygen-containing carotenoid, which was isolated in crystalline form and named canthaxanthin. Beta-carotene was identified and other pigments are described.

C.W.S.H.

1662. MIDDLEBROOK, S., AND STOREY, I. F.

Observations on cropping in three types of mushroom house.

*Mushroom Sci.*, 1950, 1: 26-34, bibl. 3.

Details of three types of house are given, the Handcraft, the American 5-6 tier, and the Yaxley. Their average yields in 3-monthly periods from 1945 to 1949 and other data are shown on graphs. Production in the Handcraft houses was at its best in winter, that of the American type in summer. In all three types there is no means of changing the air artificially. The small outlet or inlet openings in the Handcraft house may be a great hindrance to effective air change during the summer.

1663. ATKINS, F. C.

The economic duration of cropping.

*Mushroom Sci.*, 1950, 1: 24-5.

Mathematical calculation showed that the highest annual production of mushrooms would be obtained by cropping for 12 weeks. At 2.28 lb. per sq. ft., 2½ times a year, output would be 5.39 lb. per sq. ft. p.a. A simple and rapid method of calculation, devised by John Atkins, involved plotting the progress of the house on a graph and drawing a tangent from the date when the house was last emptied to the production curve, the point of contact indicating the optimum moment to empty again.

1664. PIZER, N. H.

Horse manure composts.

*Mushroom Sci.*, 1950, 1: 46-51, bibl. 4.

The physical and chemical properties of composts are described. Under the conditions of an experiment mushroom mycelium was found to tolerate a wide range of pH values. It attacked the compost most vigorously between pH 6.2 and 8.5, but rate of penetration into the compost fell off considerably about pH 7.5.

1665. SINDEN, J. W., AND HAUSER, E.

The short method of composting.

*Mushroom Sci.*, 1950, 1: 52-9.

A short method of composting used regularly by several of the most successful mushroom growers in the U.S. is described. The results of certain trials are tabulated.

1666. CHAPUIS, G., AND COUTIEU, P.

Résumé de quelques essais sur l'emploi de fumier artificiel dans la culture des champignons. (Summary of trials on the use of artificial manure in mushroom growing.)

*Mushroom Sci.*, 1950, 1: 66-73.

The authors conclude, from a comparison of results obtained from horse manure and artificial manures in mushroom growing, that the latter are satisfactory and more economical.

1667. BELS-KONING, H. C.

Experiments with casing soils, water supply and climate.

*Mushroom Sci.*, 1950, 1: 78-84, bibl. 7, illus.

The chief points brought out are:—that the water-holding capacity of the casing soil is an important factor, that a structure allowing good aeration is necessary, that a pH between 8 and 9 is most favourable for mushrooms, that no nutritive elements are required in the casing soil, and that a special water gradient between medium and air is necessary to enable the fungus mycelium to form fruiting bodies.

1668. SINDEN, J. W., AND HAUSER, E.

Report on two new mushroom diseases.

*Mushroom Sci.*, 1950, 1: 96-100, illus.

Two diseases of mushrooms in North America, the La France disease and the Vern Astley disease, are described. The cause of the former is unknown; in the latter a *Spicaria* sp. appears to be a primary agent. Thorough cleaning and disinfecting of the houses is recommended.

1669. YODER, J. B., SINDEN, J. W., AND HAUSER, E.

Experience with zinc ethylene bis-dithiocarbamate as a fungicide in mushroom cultivation.

*Mushroom Sci.*, 1950, 1: 100-8.

Apparently Parzate can reduce or almost eliminate infection from any one of four diseases which may appear in mushroom beds but it may also sometimes reduce yields of mushrooms.

1670. HEY, G. L.

The effect of new insecticides and fungicides on mushroom pests and diseases.

*Mushroom Sci.*, 1950, 1: 87-8.

A brief survey of the uses in relation to mushroom growing of DDT, BHC, HETP, TEPP, toxaphene,



chlordan (Velsicol), parathion, bis-dimethyl-amino phosphonous anhydride (Pestox III), mercury fungicides and copper 8 quinolate (hydroxy quinoline).

### Onions and related plants.

(See also 1278, 1298, 1530, 1584, 17250, p. 2142, 2150, 2151.)

1671. VORSTER, P. W.

#### Cultural experiments with onions in the Transvaal.

*Fmg S. Afr.*, 1950, 25: 313-15, 328, 353-5; 1951, 26: 20-2, bibl. 2. illus.

(1) Varietal experiments conducted during the last 5 years at the Pretoria Horticultural Research Station with South African as well as with overseas onion varieties, have shown that only a limited number of early short-day varieties, such as Early Cape Flat, can be grown in the Transvaal with a reasonable measure of success. Data are presented on length of day and average temperatures in different areas, and photographs illustrate the effects of choosing varieties not adapted to Pretoria conditions or of sowing the right varieties at the wrong time. (2) Date-of-sowing trials suggest that the first half of March is the best time for sowing Early Cape Flat in the Pretoria region. Sowing in February may give slightly higher yields, but more than half the plants are liable to run to seed, and the percentage of split bulbs is also relatively high, while late sowing was found to decrease yields. (3) The results of a third series of experiments show that transplanting is best carried out when the seedlings have reached pencil thickness. (4) The results of a 1-year experiment suggest that higher yields are obtained from directly sown than from transplanted onions, and that directly-sown onions are less susceptible to bolting. (5) If the soil is fertile the onions can be planted fairly thickly, i.e. 2 in. apart in rows 18 in. apart.

1672. HOLDSWORTH, M., AND HEATH, O. V. S.  
Studies in the physiology of the onion plant.

#### IV. The influence of day-length and temperature on the flowering of the onion plant.

*J. exp. Bot.*, 1950, 1: 353-75, bibl. 18.

A series of experiments was carried out to determine the effects of day-length, temperature and bulbing on inflorescence initiation and emergence. Small plants could not initiate inflorescences under any of the conditions tested, but in sufficiently large plants inflorescences were quickly initiated at temperatures below 15° C. Temperatures above 17° C. suppressed inflorescence initiation in growing plants and stored sets. Day-length had no effect except when temperatures were low enough to delay bulbing. In this case emergence was accelerated. Long summer days promoted bulb formation, and this in turn delayed inflorescence emergence in the following winter.

C.W.S.H.

1673. TAGUCHI, R.

#### Some physiological changes of *Allium fistulosum* var. *caespitosum* during its growth especially in winter and in the bulb-formation period. [Japanese.]

*J. hort. Ass. Japan*, 1948, 17: 59-68, bibl. 27 [received 1950].

Following autumn planting of Welsh onion bulbs, their subsequent growth sequence is a limited degree of leaf growth before winter and the resumption of leaf growth in early March, which proceeds until bulb formation intervenes at the end of April. These growth changes are paralleled by various internal changes, as determined by physical and chemical methods. Thus cessation of growth in winter is accompanied by a loss of water content of leaf and bulb tissues and a rise in content of total solid matter and soluble matter. In the spring, as leaf growth is resumed, there is first of all movement of material from the bulb to the leaf, and then from the leaf to the bulb as the latter begins to swell. The amount of reducing sugar in the bulb fluctuates in a corresponding manner. The contrary changes in the electrical conductivity of the expressed leaf juice may be attributed to viscosity changes.

1674. ADAMS, A. F. R.

#### Copper deficiency of onions grown on peat. II.

*N.Z. J. Sci. Tech. Sect. A*, 1949 (published Oct. 1950), 31: 3: 34-40, bibl. 8, illus.

In a field trial with onions suffering from copper deficiency [see *H.A.*, 20: 855] three methods of control with copper sulphate (foliar sprays, one heavy soil dressing of 200 lb. per acre, and one light soil dressing of 56 lb. per acre) each gave highly significant increases in crop yields. The greatest yields were obtained from the application, twice during the growing season, of a foliar spray of 0.25% copper sulphate in water.

1675. WITTWER, S. H., AND SHARMA, R. C.

#### The control of storage sprouting in onions by preharvest foliage sprays of maleic hydrazide.

*Science*, 1950, 112: 597-8, bibl. 8, illus. being *J. Art. Mich. agric. Exp. Stat.* 1157.

Yellow sweet Spanish onions were sprayed two weeks before harvest with several growth regulators at 75 gal. per acre. Bulbs from plants sprayed with 2,500 p.p.m. maleic hydrazide showed no sprouting after 5 months in storage, and those treated with 500 p.p.m. also showed a significant reduction in sprouting over all other treatments. Some decrease in loss from storage breakdown was also observed. Internal structure, colour, flavour and odour were all apparently normal. None of the other chemicals used inhibited sprouting. A "Barsprout" formulation increased significantly the percentage of storage loss from breakdown. Similar results from the use of maleic hydrazide have been obtained with carrots, and studies are in progress on other root crops.

1676. WITTWER, S. H., AND OTHERS.

#### The effect of preharvest foliage sprays of certain growth regulators on sprout inhibition and storage quality of carrots and onions.

*Plant Physiol.*, 1950, 25: 539-49, bibl. 13, illus., being *J. Art. Mich. agric. Exp. Stat.* 1158.

Sprouting and root growth of yellow Sweet Spanish onions held in 55° F. storage for five months were completely inhibited by the application of a water spray containing 2,500 p.p.m. of maleic hydrazide to the foliage of the intact plants two weeks before

harvesting the bulbs. Partial sprout inhibition was achieved by 500 p.p.m. of maleic hydrazide. Other chemicals either gave no significant control of sprouting or, in the case of the sodium salt of naphthaleneacetic acid and 2,4,5-trichlorophenoxyacetic acid, stimulated it. Storage breakdown was in some instances, particularly with Barsprout, more prevalent than in controls. Sprout growth of carrots held at 50° F. for three months was almost completely inhibited by foliar sprays of 2,500 p.p.m. of both maleic hydrazide and benzo-thiazol-2-oxyacetic acid applied four days before harvesting. The maleic hydrazide produced no significant alteration in the amount of dry matter, carotene, carbohydrates or Kjeldahl nitrogen in the stored carrots. Sprouting in carrots was also significantly reduced by foliar sprays of the sodium salt of alpha-naphthaleneacetic acid, 1,000 and 5,000 p.p.m., and by 500 p.p.m. of either maleic hydrazide or benzo-thiazol-2-oxyacetic acid. Accompanying the use of chemicals other than maleic hydrazide were frequent undesirable formations of callus tissues, proliferations and other abnormalities which tended to shorten rather than prolong the storage life of both carrots and onions.—Mich. St. Coll., East Lansing.

1677. GREULACH, V. A., AND ATCHISON, E.  
Inhibition of growth and cell division in onion roots by maleic hydrazide.  
*Bull. Torrey bot. Cl.*, 1950, 77: 262-7, bibl. 5.

Roots of *Allium cepa* were treated with 1, 100, 1,000 and 2,000 p.p.m. solutions of maleic hydrazide. The effects on the inhibition of total growth and of cell division were in order of the concentration of the solutions, but the effect on cell division did not occur simultaneously with the effect on total growth. Harmful effects on tissue structure occurred only among groups treated with 1,000 and 2,000 p.p.m. continuously. These were also the only groups in which there was any failure of recovery from the treatment.—Univ. of N. Carolina.

1678. WADE, G. C.  
White root rot of onions.  
*Tasm. J. Agric.*, 1950, 21: 325-6, bibl. 1, illus.

White root rot (*Sclerotium cepivorum*), the most common and serious disease of onions in Tasmania, often causes considerable losses. Leeks and shallots are also susceptible but do not suffer as severely. Control is obtained by distributing calomel dust along the drill rows, 1 lb. to each 50 yds. [See also *H.A.*, 17: 854.]

1679. DEVINE, E. S., AND HOARE, E. R.  
The Bruner onion harvester.  
*Rep. nat. Inst. agric. Engng C.S.5/1039*, 1950, pp. 19+plates 4.

Because of the increasing acreage grown, the importance of dealing with the onion crop has increased. This report describes the trial of certain windrowing and combining equipment which has been placed on the American market. It would appear that the windrowing equipment is satisfactory for use in this country [England], but the method of combine harvesting and boxing or bagging for market direct from the field is not applicable in this country. It is felt that mechanical lifting of the onion crop can be introduced, but the

crop should be allowed to dry off in trays in Dutch barns before any topping and bagging occurs. [Authors' précis.]

### Root vegetables.

(See also 1263, 1551, 1584, 1586, 1610, 1612, 1614, 1676, 1725 1, 2151.)

1680. KROMPHARDT, H.  
Untersuchungen über die Möhrenfliege (*Psila rosae* F.) in Schleswig-Holstein. (Studies on the carrot fly, *Psila rosae*, in Schleswig-Holstein.)  
*Nachr. Bl. dtsh. PflSch Dienst.*, Braunschweig, 1950, 2: 171-2, bibl. 3.

The life history of the carrot fly, the damage it causes, its ecology and parasites, are briefly described. For control, watering with "Folidol" [a phosphoric acid ester preparation] is recommended.

1681. NISHIYAMA, I.  
Breeding of cold-resistant *Raphanus sativus* by the doubling of chromosome number. [Japanese.]  
*Bot. Zool.*, 1942, 10: 57-8, illus., from abstr. in *Jap. J. Bot.*, 1943, 12: (56)-(57) [received 1950].

Colchicine-induced tetraploid plants of radish had much larger roots than the normal diploid plants, the average root weight of the Minowase strain being 60-620 g. as compared with 20-220 g. The tetraploid plants were also considerably more cold-resistant.

1682. NOGUTI, Y., AND SUGAWARA, T.  
Favourable effects of treatment of seeds and sprouts with certain growth substances.  
*Proc. imp. Acad.*, 1941, 16: 402-4, from abstr. in *Jap. J. Bot.*, 1942, 12: (19) [received 1950].

Seeds of 2 varieties of radish were soaked in aqueous solutions of potassium  $\beta$ -indole acetate and potassium  $\alpha$ -naphthalene acetate (0.02, 0.01 and 0.005%) for 24 hours, and then sown in the field. The weight of roots harvested was greater than that of the controls when the concentration of growth substance was less than  $\pm 0.005\%$ ; at higher concentrations the weight of roots was less. The highest weight of tops was obtained by using the 0.01% solution. Similar treatment of potato sprouts resulted in an increased number and weight of tubers harvested.

1683. VANDERWALLE, R.  
La jaunisse des navets. (A yellowing disease of turnips.)  
*Parasitica*, 1950, 6: 111-12.

A disease of turnips, characterized by yellowing of the leaves and retardation of development, is recorded. Inoculation of sap from diseased plants into tobacco plants produced localized yellow spots, which suggests a virus disease.

### Salad crops.

(See also 1307, 1314, 1584, 1612, 1613, 1619, 1620, 1725d.)

1684. PARMENTIER, G.  
Syntômes de carence chez la chicorée witloof. (Deficiency symptoms in Brussels chicory.)  
*Parasitica*, 1950, 6: 113-16.



The symptoms of deficiencies of P, K, and minor elements in Brussels chicory are briefly described and the effects on forced plants indicated.

# 1685. BOUCHER, J.

Deux cultures nantaises de primeurs: leur situation phytosanitaire. (Disease problems of two early crops in the Nantes region.)

Rev. hort. Paris, 1951, 123: 336-8, illus.

A damping off of outdoor lettuce and a wilt of melons are causing serious losses to growers in the Nantes region, and no solution has yet been found to the problem. The damping off, which attacks the collar of the plants at any time from planting out to maturity, is thought to be caused by *Sclerotinia minor* or *S. fuckeliana*. In trials carried out during 1949 and 1950 with various soil disinfectants, infection was reduced from 25-50% to 11% by the use of a pre-planting application of an organo-mercury solution. Further trials are planned to determine whether better control can be obtained by disinfecting the soil with formalin and by using only very well decomposed manure. The melon disease has been identified as a fusarium wilt, and observations suggest that it is transmitted by the melon aphid, *Aphis frangulae*. The best control was obtained by regular applications of rotenone.

## Spinach.

(See also 1580, 1584, 1610, 1612, 1613, 1620.)

# 1686. NOLTE, H.-W., AND KLINKOWSKI, M.

Die Bekämpfung der Rübenfliege mit Ester-Präparaten. (The control of the spinach leaf miner with ester preparations.)

NachBl. dtsh. PflSchDienst, Berlin, 1950, 4: 227-30, bibl. 4.

A severe attack by spinach leaf miner (*Pegomya hyoscyami*) was observed on fodder crops, sugar beets and spinach in the spring of 1950 in Germany. Good control was obtained in both laboratory and field experiments with esters of phosphoric and thiophosphoric acid. Dusting was found to be a more effective means of application than spraying, and when sprays were used they were more effective on spinach than on the smooth-leaved beets.

## Sweet corn.

(See also 1270, 1305, 1331m, 1579, 1580, 1584, 1592, 1593, 1603b, 1725c, 1729, 2158.)

# 1687. HASKELL, G., AND SELMAN, G. G.

Studies with sweet corn. III.\* The primary effects of treating seeds with ultrasonics.

Plant and Soil, 1950, 2: 359-73, bibl. 15.

In preliminary laboratory experiments inbred sweet corn seed was treated with ultrasonics at a frequency of 1 Mc/sec. For field studies, doses of 35 watts/cm<sup>2</sup> were given for 5 and 15 minutes, 10 watts/cm<sup>2</sup> for 30 minutes and heat treatments at 50° C. for 15 and 30 minutes. From the results of their trials the authors draw the conclusion that "ultrasonics have little value in commercial maize production owing to lowered germination. They might produce additional heterosis by producing mutations controlling degenerative changes. Widely publicised statements on the

value of ultrasonics in agriculture are doubted."—John Innes Horticultural Inst. and King's College, London.

# 1688. APPLE, J. W., AND DECKER, G. C.

Corn borer control on sweet corn with concentrated sprays.

J. econ. Ent., 1950, 43: 407-14, bibl. 3.

Four experiments on the control of corn borer, *Pyrausta nubilalis*, were carried out at Illinois with concentrated sprays used in most cases at the rate of 3 gal. per acre. Concentrated sprays providing 1.5 lb. of DDT to the acre did not give as good first generation control as a similar amount of DDT in dilute emulsion sprays applied at the rates of 10 and 50 gal. per acre. Against second generation borers the results were equal. The concentrated sprays containing DDT were oil solutions and water emulsions, and, while no significant difference in borer control was observed, the oil solutions seemed to offer a slight advantage. Parathion in oil solution was more toxic than DDT in concentrated spray form; oil solutions of dichlorodiphenyl dichloroethane and aldrin were approximately equal to DDT, but toxaphene, heptachlor and chlordane were inferior. Phytotoxic evaluations showed that water emulsions were less injurious to corn foliage than oil solutions.

# 1689. KLOSTERMEYER, E. C.

Effect of soil fertility on corn earworm damage.

J. econ. Ent., 1950, 43: 427-9, bibl. 10, being Sci. Pap. Wash. St. agric. Exp. Stats. 914.

Maize and sweet corn grown on soil with a high N status were damaged less severely and had a lower infestation of corn earworm, *Heliothis armigera*, than corn grown without nitrogen fertilizer. This reduced infestation was attributed to possible lower moth population at the earlier dates of silking, to a greater number of ears, to increased length and tightness of husks and to larger size of ears.

# 1690. KULASH, W. M.

Further tests for earworm control in sweet corn.

J. econ. Ent., 1950, 43: 430-2, bibl. 2.

Five insecticides, applied both as dusts and sprays, were used in North Carolina against earworm, *Heliothis armigera*, attacking Golden Cross Bantam sweet corn. There was no significant difference between the two methods of treatment, and all materials reduced the infestation, in the following descending order: DDT; dichlorodiphenyl dichloroethane; 2-nitro-1, 1-bis (p-chlorophenyl) propane; toxaphene; 2-nitro-1, 1-bis (p-chlorophenyl) butane. No off-flavour was detected in the corn from any treatment.

## Sweet potatoes.

(See also 1725i, q, 2154.)

# 1691. PATEL, G. A.

Sweet potato.

Poona agric. Coll. Mag., 1950, 41: 120-3.

The method of sweet potato cultivation in Bombay is outlined. Notes are included on climate, soil, layout and planting, after-care, top dressing, irrigation and turning of the vines. About 100 varieties are known,

\* For I and II, see H.A., 20: 863 and 1683.

but from the market point of view only three are important, namely, Red, White, and Ceylon Cluster white. Of the diseases of sweet potatoes black rot is the only one encountered in the State, while among pests, the sweet potato weevil is the most important. Production costs are tabulated.

1692. TOGARI, Y., AND KAWAHARA, U.

**Studies on the self- and cross-incompatibility in sweet potato. I. On the different grades of incompatibility among the compatible matings. II. Pollen behaviours in the incompatible and compatible pollination.** [Japanese, English summary.]

*Bull. imp. agric. Exp. Stat. Tokyo* 52, 1942, pp. 19, illus., from abstr. in *Jap. J. Bot.*, 1943, 12: (65)-(66) [received 1950].

In self- and intra-varietal pollinations of sweet potato, the pollen failed to germinate on the stigma. Three groups have been established, the varieties within each group being incompatible among themselves and compatible with those of another group. The fertilizing power of the pollen was greatest in group A and least in group C, while the fertility of the ovule was greatest in group C and least in group A.

1693. U.S. DEPARTMENT OF AGRICULTURE.

**Sweetpotato weevil (*Cylas formicarius elegantulus* (Sum.).)**

*Pict. Sheet U.S. Dep. Agric.* 25, 1950, pp. 2, illus.

Control measures include plant hygiene, dusting the store with 10% DDT, at 1 lb. to each 1,600 sq. ft., the use of State-certified seed sweet potatoes, and crop rotation.

### Tomatoes and related plants.

(See also 1253, 1289, 1301, 1326, 1468, 1608, 1617, 1725b, e, 1755, 1784, 2142, 2151, 2179.)

1694. BALDINI, E.

**La biologia del peperone. (The biology of pepper plants.)**

*Ital. agric.*, 1950, 87: 628-37, bibl. 30, illus.

A study of the morphology and physiology of *Capsicum*, with mention of *C. frutescens* and *C. annuum* and their horticultural varieties. Details are given of the floral organs of *C. annuum*, with illustrations of the fruits of certain varieties, and notes on crossing experiments.

1695. POWERS, L.

**Gene analysis of weight per locule in tomato hybrids.**

*Bot. Gaz.*, 1950, 112: 163-74, bibl. 18.

An experiment was laid down with the tomato varieties Danmark, Red Currant and Johannisfeuer, every possible hybrid between these parents, and the  $P_1$ ,  $B_1$  to  $P_1$ ,  $F_1$ ,  $F_2$ ,  $B_1$  to  $P_2$ , and  $P_2$  populations of each hybrid. The contribution of each additional gene to weight per locule was studied. C.W.S.H.

1696. BREŽNEV, D. D.

**Increasing the effect of crossing in tomatoes.** [Russian.]

*Agrobiologija* (Agrobiology), 1950, No. 5, pp. 132-5.

Intravarietal pollination experiments showed that plants from seeds derived from flowers fertilized with

pollen from plants growing in another locality gave higher yields than plants from seeds from selfed flowers. Intervarietal crossing gave similar results.

1697. MOLOTKOVSKIĬ, G. H.

**Prolonging the life of certain annual plants by grafting.** [Russian.]

*Doklady Akad. Nauk. S.S.S.R.*, 1950, 71: 1131-4, bibl. 16, illus.

In reciprocal grafts of annual and perennial varieties of herbaceous solanaceous plants, the life of the annuals, used either as scions or as rootstocks, was prolonged. Thus tomato scions grafted on *Physalis* spp. lived  $1\frac{1}{2}$  to 2 months longer than did control plants.

1698. ESAJAN, G. S.

**The rooting of cuttings of the seedling progeny of tomato hybrids.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 71: 1129-30, bibl. 2.

Success in the vegetative propagation, by cuttings, of tomato hybrids raised from seed increases progressively with repetition, and this character is maintained in reproduction from seeds of the plants raised from cuttings.

1699. KRUIZILIN, A. S., AND ŠVEDSKIIA, Z. M.

**The individual role of leaves at different stages.** [Russian.]

*Agrobiologija* (Agrobiology), 1950, No. 5, pp. 80-93.

Experiments are described and data tabulated for tomato. The predisposition of lateral shoots to form blossoms depends on the stage of development of the meristem of the central fruiting stem. The upper shoots are older than the lower laterals (in tomato at the lowest 4 nodes). Grafting the lower (younger) side shoots on the upper (older) parts, and the upper on the lower does not alter their developmental predisposition, but the grafting operation checks their development. The leaves of the main stem affect the development of the shoots growing in their axils only when these shoots are formed from meristem that is still active (in tomato this occurs only at the lowest 4 nodes).

1700. OSBORNE, D. J., AND WAIN, R. L.

**Studies on plant growth-regulating substances. II. Synthetic compounds inducing morphogenic responses in the tomato plant.**

*J. hort. Sci.*, 1950, 26: 60-74, bibl. 29, illus.

A range of compounds of the aryloxyaliphatic acid type has been synthesized and the capacity to induce morphogenic effects on the tomato plant has been studied. Plants were treated by the application of lanolin solutions to parts of a leaf petiole and stem, and growth responses recorded over some 6 weeks. At the concentrations used certain of these substances produced epinastic and morphogenic responses some of which had previously been recorded by other workers. Other compounds produced epinasty only; the remainder were completely inactive.  $\alpha$ -(2-naphthoxy) phenylacetic acid (NPA) was found in these experiments to produce responses somewhat similar to those shown by tomato plants treated with 2:3:5-triiodobenzoic acid (TIB). These results were confirmed



in a series of comparative experiments using different methods of application. Tomato plants treated with NPA and TIB both show frenching and fasciation of leaves, and the development of inflorescences in the terminal position. Quantitatively TIB was the more active compound. [Authors' summary.]—Wye College.

1701. VAN BLOMMESTEIN, J. A.  
Should tomatoes be trained?  
*Fmg S. Afr.*, 1950, 25: 329.

Results of experiments at the Nelspruit Research Station led to the conclusion that the training of summer tomatoes is desirable, as it increases the yield of marketable fruit by 7,500 lb. per morgen. This increase is due to a reduction in injury from sun burn, rotting and insects, to more effective disease and pest control and to a reduction in mechanical injury to plants and fruit. With winter tomatoes training is not considered profitable.

1702. GILES, J. E., AND ALEXANDER, D. McE.  
Frequency of irrigation for tomato plants.  
*J. Aust. Inst. agric. Sci.*, 1950, 16: 95-100, bibl. 2.

Experiments were carried out over three seasons on Barmera sand in Victoria. In the first two seasons irrigation was carried out at specific time intervals—1 and 3 weeks in 1945-6, and 1, 3, 4 and 5 weeks in 1947-8. In 1948-9, however, the frequency was based on evaporation recordings. The results showed that, in a normal season, furrow irrigation after 7-8 inches evaporation had occurred was sufficient to maintain a satisfactory soil moisture level. Yield records, though not always showing significant differences, indicated that optimum yields might be expected from irrigating at about 3 weekly intervals. Irrigation at 1-week intervals had an adverse effect on health and yield in the 1945-6 season. No differences were found in the ripening of the tomatoes, or in total growth. Frequent irrigation produced a shallower and less well distributed root system.

C.W.S.H.

1703. HAGAN, R. M.  
Soil aeration as a factor in water absorption by the roots of transpiring plants.  
*Plant Physiol.*, 1950, 25: 748-62, bibl. 22, illus.

The effect of nitrogen and of carbon dioxide on the rate of water absorption by the roots of previously wilted, transpiring tomato plants was measured by observing the time required for equally wilted, paired plants to recover turgor following irrigation under controlled soil-atmosphere conditions in a constant-environment room. The ratio of the time of recovery for nitrogen-treated plants to that for the aerated check plants had a mean value of  $1.4 \pm 0.08$  (S.E. of mean) and for carbon-dioxide-treated plants of  $2.6 \pm 0.17$ . These ratios confirm the observations of others that carbon dioxide has a direct effect on the plant, in addition to that caused by the removal of oxygen. These ratios were independent of the severity of the initial wilting and of the period of gas saturation up to several hours prior to irrigation. The rate of water absorption decreased rapidly after introduction of the gases. Readily detectable differences in recovery

were sometimes apparent after a total exposure of less than one hour, particularly with carbon dioxide. The effects of these gases appear to be reversible over short periods, inasmuch as their replacement by air restored a normal rate of water absorption. Deficient aeration, presumably by controlling metabolic activities which influence cell permeability, may affect directly and very rapidly the rate of passive water absorption. Over a longer period of time, poor aeration may indirectly retard passive water absorption further by causing a reduction in absorbing root surface. [From author's summary.]—University of California, Davis.

1704. McILRATH, W. J.  
Growth responses of tomato to nutrient ions adsorbed on a pumice substrate.  
*Plant Physiol.*, 1950, 25: 682-701, bibl. 27, illus.

This investigation employing the Pan America variety of tomato was undertaken to determine the availability for plant growth of ions of magnesium, potassium, calcium and phosphorus which had been adsorbed on a pumice substrate. Each of these ions was adsorbed on a separate lot of pumice and all the other essential elements were supplied in a nutrient solution. Four single ion pumice-adsorption complexes were employed and the series designated as —Mg, —K, —Ca and —P respectively. For comparison a control series with an inert quartz gravel substrate was also employed, to which all of the essential elements were supplied in nutrient solution. Loss of appreciable amounts of previously absorbed nitrogen and phosphorus from tomato plants to the substrate was noted in all series at the flower initiation phase. In the —K series, tissue content of calcium was low when the available potassium supply in the nutrient solution was high. Compared with gravel, the pumice substrate did not enhance yield or accelerate maturation of tomato plants. Plants in the —Ca series paralleled control plants grown in gravel in leaf and node number but had a smaller total leaf area and were shorter than controls in stem height. Plants of the —Ca series exhibited symptoms of calcium deficiency. Plants dependent upon magnesium, potassium and phosphorus adsorbed on pumice were comparable in stem height, total leaf area, number of leaves and number of nodes to those grown in gravel containing a complete nutrient solution. The total weight of fruit from plants in the —Mg and —K series produced in a 12-week growing period was comparable to gravel controls but slightly less than controls in the —P series. Root systems of the plants grown in pumice substrates were much larger than those in the gravel controls. They ramified throughout the individual lumps of pumice and were in intimate contact with the pumice substrate as if responding to a strong tropic stimulus. The total quantity of an element absorbed by the plants from a pumice-adsorption complex was less than when the ion was supplied in nutrient solution but plant growth was essentially comparable. Pumice treated as described supplied sufficient amounts of available magnesium, potassium and phosphorus for normal growth but not enough of calcium. Calcium evidently is not held firmly by pumice, as indicated by the early leaching thereof into the nutrient solution. Pumice compares favourably with other artificial

substrate used in nutritional studies. It is cheaper than most solid substrates, a fact which may permit use of pumice in large-scale experimental and commercial operations. [From author's summary.]—Agric. mech. Coll., Texas.

1705. KIDSON, E. B.

**"Hard-core"—a nutritional disorder of tomatoes.**

*J. hort. Sci.*, 1950, 26: 8-21, bibl. 1, illus.

Hard-core, a disorder of outdoor tomatoes in the Nelson district of New Zealand, was found associated with a low K content of leaves and fruit, and susceptibility was shown to be inversely related to the amount of exchangeable K. The disorder was worst in plots receiving no fertilizer. Soil sterilization with steam or chloropicrin was beneficial, but did not control the disorder on badly-affected areas. Rich organic manures were very effective in decreasing the amount of hard-core; heavy dressings of potash fertilizers also reduced, but did not eliminate, it.—Cawthron Institute, Nelson, N.Z.

1706. BRENNAN, E. G., LEONE, I. A., AND DAINES, R. H.

**Fluorine toxicity in tomato as modified by alterations in the nitrogen, calcium, and phosphorus nutrition of the plant.**

*Plant Physiol.*, 1950, 25: 736-47, bibl. 10.

The effects of varied nitrogen, calcium, and phosphorus nutrition on the susceptibility of tomato plants to injury from NaF applications to the roots and HF fumigation of the tops of the plants are summarized as follows. Typical symptoms of fluorine toxicity consisting of tip and marginal scorching of the younger fully expanded leaves were identical whether treatment consisted of fluorine application through the roots or fluorine fumigation of the plant tops. Medium levels of nitrogen, calcium, and phosphorus favoured absorption and translocation of fluorine in sufficient quantities to cause visible leaf injury by root treatments and also absorption of toxic quantities of fluorine in plants fumigated at the higher fluorine level. A review of the data suggests that these levels are approximately 112 p.p.m. N, 40 p.p.m. Ca, and 62 p.p.m. P. Excessive amounts of nitrogen and calcium prevented fluorine injury, as did deficiency of these elements. Whether this would also be true of phosphorus if the range were extended high enough to include a luxury supply, or whether phosphorus is actually effective in mobilizing fluorine is not clear. Symptoms of severe fluorine toxicity on the leaves were invariably associated with the highest fluorine foliage content in the three nutritional groups in the root fluorine treatment. This was not so marked in the fumigated series. Root injury occurred in the same plants which showed foliage injury in the root-treated series. There was no indication of fluorine injury to roots as a result of fumigation. Root injury was not associated with a high F content, many of the highest fluorine values occurring within the healthiest root systems. When NaF was added to the substrate, although fluorine was translocated to the leaves, the roots almost invariably showed a greater fluorine accumulation than did the leaves. In contrast, fumigated plants showed a high accumulation of fluorine in the leaves and a normal

amount in the roots, suggesting the absence of downward translocation of fluorine from the leaves. The lower fumigation (·048 p.p.m. F) produced no injury on tomato foliage, indicating that this concentration was below the critical rate for injury to tomato. The high fumigation rate (·47 p.p.m. F) produced definite injury. The average fluorine content in the leaves as a result of fumigation at ·048 p.p.m. F was 40 p.p.m., whereas at the ·47 p.p.m. F fumigation level the average was 477 p.p.m., indicating the probability that, within limits, plants grown under similar environmental conditions absorb fluorine in proportion to the amount present in the atmosphere. Where foliage accumulation of fluorine was brought about by fumigation, there appeared to be a loss in fluorine from the leaf tissue within a seven-day period. No such loss was obvious where fluorine accumulation resulted from fluorine added through the roots. [From authors' summary.]—N.J. agric. Exp. Stat., Rutgers Univ.

1707. GOVINDAN, P. R.

**A note on the influence of boron on the yield and ascorbic acid content in the tomato fruit.**

*Curr. Sci.*, 1950, 19: 319, bibl. 4.

Increased applications of B resulted in more and larger tomato fruits and in higher vitamin C contents in green, yellow and ripe fruits.

1708. KERTESZ, Z. I., AND MCCOLLOCH, R. J.

**The pectic substances of mature John Baer tomatoes.**

*Bull. N.Y. St. agric. Exp. Stat.* 745, 1950, pp. 15, bibl. 23.

The various pectic substances present in tomatoes are known to affect the texture and firmness of fresh and canned fruit and the consistency of tomato products very considerably. These studies indicate that the pectic substances in John Baer tomatoes do not show any definite trends in either quantity or composition during the period from just before until just after the peak of optimum ripeness for processing, as judged mainly by colour. This supports the theory that colour is not a reliable indicator of true maturity in tomato fruits. Three characteristic types of pectinic acids were found to be present, which were distinguished by their solubility behaviour, uronide and methoxyl content, and solution viscosity. About a quarter of the pectinic acids obtained by extraction with ammonium oxalate were found to be low-ester pectinic acids. This finding is of significance in explaining the reactivity of the pectic constituents with polyvalent ions, such as calcium, used in firming canned tomatoes.

1709. KLJUČAREVA, M. V.

**The colour plastids of tomato. [Russian.]**  
*Agrobiologija* (Agrobiology), 1950, No. 3, pp. 146-8, bibl. 1, illus.

From a study of the colouring of tomato fruits, illustrated by three coloured plates showing tomato cells with plastids, it is concluded that (1) the chloroplasts become disintegrated as the fruit ripens; they dissolve and become invisible and their pigment disappears; (2) the red and the yellow plastids arise as a result of the reconstruction of the cell contents in the final stages of fruit development.



## 1710. ROBERTS, F. M.

The infection of plants by viruses through roots.

*Ann. appl. Biol.*, 1950, 37: 385-96, bibl. 11.

Tomato bushy stunt, tobacco mosaic and potato X viruses caused root infections of tomato plants both when the roots were inoculated and when the viruses were added to the soil or culture solutions. Full systemic infection of roots and shoots sometimes followed. Spread of infection between plants by root contact was also observed. Potato plants whose roots were inoculated produced infected tubers but rarely had infected foliage.—Rothamsted exp. Stat. C.W.S.H.

## 1711. KAWAMURA, E.

A free virus in dew and rain on mosaic tomato plants. [Japanese, English summary.]

*Ann. phytopath. Soc. Japan*, 1941, 11: 7-10, illus., from abstr. in *Jap. J. Bot.*, 1942, 12: (11) [received 1950].

Dew and rain water, collected from the leaves of mosaic-infected tomato plants, was rubbed on the leaves of *Nicotiana*. Numerous local lesions, typical symptoms of the mosaic virus, appeared after a few days.

## 1712. KITAGAWA, M., AND AKUNE, S.

Chemical studies on tomato ring mosaic virus.

*Proc. imp. Acad.*, 1941, 17: 374-8, illus., from abstr. in *Jap. J. Bot.*, 1942, 12: (12) [received 1950].

Protein crystals, proved to be crystals of the tomato ring mosaic virus, have been obtained from infected tobacco plants.

## 1713. BROCK, R. D.

A search for resistance to defoliation by *Alternaria solani* in the genus *Lycopersicon*. *J. Aust. Inst. agric. Sci.*, 1950, 16: 90-4, bibl. 7.

The fungus *Alternaria solani* causes defoliation of the tomato in Australia and reduces yield and quality of fruit. By spray inoculation with mycelial suspensions the relative pathogenicity of 12 isolates of *A. solani* on tomatoes and potatoes was investigated. Some isolates were consistent in their pathogenicity even after successive inoculations through both hosts. Other isolates were inconsistent, suggesting that they were a mixture of strains. Exhaustive tests with a large number of varieties of *Lycopersicon esculentum* and with *L. pimpinellifolium*, *L. peruvianum*, and *L. hirsutum* failed to reveal any species or variety resistant to *A. solani*. It was noted that plants making bushy growth provide a better environment for the development of the disease. C.W.S.H.

## 1714. MARTIN, W. J.

The role of fresh-market tomato fruits in the dissemination of *Phytophthora infestans*. *Plant Dis. Repr.*, 1950, 34: 236.

Observations on the development of late blight in Louisiana in 1949 and 1950, together with the observation of viable *Phytophthora infestans* on imported tomato fruits, suggest the possibility of its dissemination via affected fresh-market tomato fruits.

## 1715. MACNEILL, B. H.

Studies in *Septoria lycopersici* Speg.

*Canad. J. Res., Sect. C*, 1950, 28: 645-72, bibl. 13, illus.

Investigations into the biology of *Septoria lycopersici* Speg., a leaf-spotting fungus parasite of the tomato, reveal that this fungus species is composed of at least two physiologic races, which show both qualitative and quantitative differences in their pathogenicity. Other factors, such as humidity, temperature, light, and host nutrition, which influence host-parasite interaction, have been shown to cause further variability in the symptomatological picture. A minimum period of 48 hrs. at saturation is required to promote spore germination and stomatal penetration, but this experience at high humidity need not be continuous. The fungus inhabits an intercellular locus, but is very intimately associated with the cells of the tissues parasitized. There is no evidence of action in advance; rather a certain measure of host-parasite equilibrium is maintained, and the pathogen is enabled to complete its life cycle and reinstate infection. It is pointed out that while *S. lycopersici* might be considered, in the sense of de Bary, either as a facultative saprophyte or an obligate parasite, its peculiar behaviour makes it exceedingly difficult, if not impossible, to place it into any one category which might describe its biological activity. [From author's abstract.]—Univ. Toronto and hort. Exp. Stat., Vineland.

## 1716. KEYWORTH, W. G.

Inoculation of plants with vascular pathogens.

*Nature*, 1950, 166: 955.

In the course of an investigation on the reaction of plants to infection with *Verticillium albo-atrum*, which made it desirable to secure systemic infection of young plants without introducing the pathogen through the roots, new methods of inoculation were devised. A technique is described for infecting cuttings of tomato, antirrhinum, aster and carnation (the last named with *V. cinereascens*), and inoculating hop plants via the pith cavity.

## 1717. EDWARDS, F. I., JR., AND SMITH, F. F.

Plant injury from parathion and related compounds.

*J. econ. Ent.*, 1950, 43: 471-3, bibl. 1.

Two types of plant injury were observed on tomatoes treated with high rates of some technical grades of parathion. The degree of injury appeared to be directly related to the impurity of the technical material. No injuries or only slight injuries occurred where the better grades of commercial products were used at the normal concentration of 0.5 lb. parathion per 100 gal. water.

## 1718. MORGAN, S. R., AND LYONS, T.

Refined BHC for wireworm in tomato . . . no off-flavor.

*Agric. Chemls*, 1950, 5: 11: 31-3, 81, bibl. 5.

Small amounts of "Isotox Wettable No. 250", containing 25% gamma isomer, and "Isotox Seed Treater No. 75", containing 75% isomer, when added to the transplant water resulted in good control of wireworms and no off-flavour could be detected in fresh or processed tomatoes. Results indicate that 2 oz. of the pure gamma isomer should be applied per acre. When used at the suggested rates the materials

had no apparent effect on the tomato plants or production.

1719. FIDLER, J. C., AND NASH-WORTHAM, J. R. H.

Ripening of tomatoes. II. Further experiments on the effects of ethylene.

*J. hort. Sci.*, 1950, 26: 43-6, bibl. 2.

The results tabulated indicate that ethylene does not significantly accelerate the ripening of indoor or end-of-season outdoor tomatoes, and confirm the previous conclusion [*H.A.*, 20: 1710] that mature tomatoes may usually be ripened satisfactorily in a warm room with a fairly high relative humidity, without the use of ethylene.—Covent Garden Laboratory, D.S.I.R.

### Other crops.

(See also 1725a, j.)

1720. REITSMA, J., AND SLOOFF, W. C.  
*A Pythium disease of Basella rubra.*  
*Contr. gen. agric. Res. Stat. Bogor* 109, 1950, pp. 3-11, bibl. 4, illus.

*Basella rubra*, a tropical vegetable, is fairly resistant to attack by *Pythium butleri*, and may be cultivated on infested soils, provided that old stem cuttings are used for propagation and that the plants are allowed to climb stakes. The best results are obtained when rooted stem cuttings are planted.

1721. REITSMA, J., AND SLOOFF, W. C.  
*Cercospora malayensis* on *Hibiscus esculentus* L.  
*Contr. gen. agric. Res. Stat. Bogor* 109, 1950, pp. 34-8, bibl. 4, illus.

Two plots of *Hibiscus esculentus* (okra) in the experimental garden at Maura, near Bogor (Buitenzorg), were infected in 1943 with *Cercospora malayensis*. The symptoms were a mosaic-like mottling and an upward bulging of the leaves, followed by the development of necrotic zones at the margins. The fungus is described.

1722. ALBERTS, H. W.  
*Quinoa—ancient food crop in South America.*  
*Agric. in the Amer.*, 1947, 7: 12: 150-2, from abstr. in *Rev. appl. Ent.*, 1950, 38: 449.

Quinoa (*Chenopodium quinoa*) was formerly an important food crop among the Indians of Andean America, but is now cultivated only on a small scale in Peru. The method of cultivation and uses of the crop for food and fodder are described. It is occasionally damaged by insects, some of which are mentioned.

1723. MATHOT, H. J., AND DOESBURG, J. J.  
Het gebruik en de samenstelling van rabarber. (The use and composition of rhubarb stems.) [English summary 1 p.] Reprinted from *Voeding*, 1950, 11: 423-39, bibl. 14, as *Overdruk Inst. Bewar. Verwerk. TuinbProd. Wageningen* 25, 1950.

In rhubarb stalks (petioles) the total solids, sugar- and ascorbic acid content increase with age, though they sometimes show some decrease in the older stems. Titratable acid content always decreases during ageing while the content of oxalic acid (=oxalic acid, soluble oxalates and insoluble oxalates) becomes

higher. The tops of the stalks of different ages have a higher sugar- and ascorbic acid content and lower amounts of soluble oxalates than the bases, and so have the higher nutritive value.

1724. VENKATARAMANI, K. S.  
Some factors governing the vitamin C content of *Trigonella foenum-graecum*.  
*Proc. Indian Acad. Sci., Sect. B*, 1950, 32: 112-25, bibl. 25, illus.

In studies on *Trigonella foenum-graecum*, a leafy vegetable, it was found that about 80% of the total vitamin C content occurred in the leaves. The stem and roots showed low, and the leaves and flower buds high, concentrations. As plants developed, the vitamin C content of the shoot gradually increased up to the time of flowering and thereafter declined. Plants exposed to full sunlight showed higher vitamin C values than plants grown in a glasshouse under diffused light. Where plants were kept in total darkness for 24 hours the vitamin C content declined, and, although re-exposure to full light caused the vitamin content to rise again, it did not reach the level found in control plants. The vitamin C content was found to vary during the day, the lowest value occurring early in the morning and the highest at 2 p.m. When  $\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$  was added to pot plants growing in garden soil at the rate of 0.05 g. per 3,000 g., significant increases occurred in fresh weight, dry weight and vitamin C content; with higher levels of  $\text{MnSO}_4$ , however, little or no beneficial effect occurred. With seedlings grown in sand culture a deficiency of either N or K produced a decrease in vitamin C.

### Noted.

1725.  
a ANON.  
La okra o gumbo, *Hibiscus esculentus*. (Okra: a note on uses and cultivation.)  
*Rev. agric. Guatemala*, 1950, 1 (Series 3a): 41-2, illus.  
b CAPINPIN, J. M., AND ALVIAR, M. A.  
Heterosis in the eggplant.  
*Philipp. Agric.*, 1949, 33: 126-41, bibl. 4, illus.  
c CUTKOMP, L. K., AND HOLDAWAY, F. G.  
Small scale field evaluation of insecticides for corn borer control.  
*J. econ. Ent.*, 1950, 43: 433-8, bibl. 4, being *Pap. Sci. Ser. Minn. agric. Exp. Stat.* 2539.  
d DUMONTHAY, J.  
Une variété de laitue romaine qu'il ne faut pas abandonner. (A cos lettuce variety worth preserving.)  
*Rev. hort. suisse*, 1951, 54: 15-17, illus.  
The hardy "Brune de Plainpalais".  
e GOIDANICH, G.  
Le avversità del pomodoro. (Diseases and pests of tomato.)  
*Ital. agric.*, 1950, 87: 682-93, illus.  
f HITCHINS, P. E. N.  
Using D.D. against root knot eelworm.  
*Fruitgrower*, 1950, No. 2866, p. 658.



- g MINISTRY OF AGRICULTURE, LONDON.  
Cauliflower mosaic.  
*Adv. Leaflet, Minist. Agric. Lond.* 370, 1950, pp. 3, illus., 1d.
- h MINISTRY OF AGRICULTURE, LONDON.  
Flea beetles.  
*Adv. Leaflet, Minist. Agric. Lond.* 109, 1950, pp. 4, illus., 1d.
- i OKAMOTO, H.  
On the mosaic disease of sweet potato.  
[Japanese.]  
*Ann. phytopath. Soc. Japan*, 1941, 11: 148-51, illus., from abstr. in *Jap. J. Bot.*, 1942, 12: (23) [received 1950].  
Effect of temperature.
- j PATHAK, G. N., AND SINGH, R. N.  
Pollination and fruit setting in Parwal (*Trichosanthes dioica* Roxb.).  
*Indian Fmg.* 1950, 11: 67-8.
- k PREST, R. L.  
Cabbage, cauliflower, and related crops.  
*Qd agric. J.*, 1950, 71: 316-24, illus.  
A guide to cultivation under Queensland conditions.
- l REITSMA, J., AND SLOOFF, W. C.  
Leaf spot of *Beta chiliensis* L. caused by *Cercospora beticola* Sacc.  
*Contr. gen. agric. Res. Stat. Bogor* 109, 1950, pp. 42-9, bibl. 19, illus.
- m SCHREIER, O.  
Der Kohlweissling. (Cabbage white butterfly.)  
*Flugbl. Bundesanst. PflSchutz, Wien* 64, 1950, pp. 2.
- n STAPLETON, N. M., AND McDERMOTT, L. A.  
The role of the aphids, *Brevicoryne brassicae* and *Myzus persicae*, in the spread of *Xanthomonas campestris*, the causal organism of black rot of turnips.  
*Canad. J. Res., Sect. C*, 1950, 28: 699-705, bibl. 12, illus.
- o STROGANOV, A. K.  
Onion seed production [in Russian]. [Russian.]  
*Sad i Ogorod* (Orchard and garden), 1950, No. 10, pp. 62-4.
- p USTINOVA, E. I.  
The biology of flowering and pollination of various onion species. [Russian.]  
*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1950, 15: 10: 16-24, bibl. 12, illus.  
A biological and cytological study of *Allium* spp.
- q WATANABE, K.  
A histological study of sweet potato flowers. [Japanese, German summary.]  
*Proc. Crop Sci. Soc. Japan*, 1939, 11: 135-46, illus., from abstr. in *Jap. J. Bot.*, 1940, 11: (38)-(39) [received 1950].
- r WILLIAMS, K. T., BEVENUE, A., AND WASHAUER, B.  
A study of the use of ion-exchange resins for the removal of non-sugar reducing substances in the analysis of fresh and dehydrated vegetables for reducing sugars.  
*J. Ass. off. agric. Chem. Wash.*, 1950, 33: 986-94, bibl. 14.

## POTATOES.

### General.

(See also 1291, 2143, 2168.)

1726. BLACK, W., AND OTHERS.  
Seed potato production.  
*Bull. Edinb. Coll. Agric.* 21, 1950, pp. 30.  
This report on a conference on seed potato production, held in Perth in August 1949, contains the text of the following papers: "Breeding new varieties" (W. Black), "The registration of potato varieties" (T. P. McIntosh), "Potato storage" (G. Porter), and "What the English grower wants" (W. Caldwell).
1727. DAVIES, A. J.  
Seed potato production in Wales.  
*Agriculture, Lond.*, 1950, 57: 420-6, bibl. 2.  
From surveys of potato fields in Wales, in relation to the production of seed tubers free from virus diseases, particularly leaf roll, it is concluded that there are large areas which are admirably suited to the growing of seed potatoes.—N.A.A.S.
1728. PATTERSON, H. L., AND HASLETT, E.  
Costs of potato production in central and western Ontario, Canada.  
*Amer. Potato J.*, 1950, 27: 285-7.  
The costs of growing and harvesting potatoes up to marketing time are analysed for 50 farms in western, and 20 farms in central, Ontario. Averages are

tabulated for the following: (1) costs per acre by sources (e.g. man labour, machinery, etc.); (2) man hours used per acre; (3) costs per acre analysed under (i) labour, power, machines, (ii) materials used, (iii) overheads; and (4) relation of size of area under potatoes to costs and time requirements.

1729. U.S. DEPARTMENT OF AGRICULTURE AND WASHINGTON STATE AGRICULTURAL EXPERIMENT STATIONS.  
Soil, water, and crop management investigations in the Columbia Basin project.  
*Bull. Wash. St. agric. Exp. Stats.* 520, 1950, pp. 75, bibl. 9, illus.

Following a general account of this new development area and its soils and climate, the results of experimental work on sweet corn, popcorn, potatoes, fruits and vegetables are outlined. Some results have already been published elsewhere, others will be published later. An apparently physiological disorder of Netted Gem potatoes has been observed, characterized by severe stunting and leaf malformation and by indistinct bronzing and yellowing of the foliage. Limited trials with sprays containing Zn, Cu, Mn, Fe and B produced no beneficial results. Zinc deficiency has been encountered in maize and sweet corn, giving rise to symptoms resembling those usually attributed to phosphorus deficiency.

**Breeding and varieties.**

(See also 1726, 1783.)

1730. STEVENSON, F. J., AND EDMUNDSON, W. C.

**Storage of potato seeds.**

*Amer. Potato J.*, 1950, 27: 408-11.

Tightly stoppered bottles seemed to preserve the viability of potato seeds longer than paper containers. Cold storage was found helpful under the climatic conditions of Beltsville, Maryland, but it was unnecessary at Greeley, Colorado, where there is a much lower relative humidity. At Greeley, potato seeds stored for 13 years in tightly stoppered bottles in a cool room, without controlled temperature, showed 81% germination.

1731. SINHA, N. P.

**On the somatic chromosomes of some non-tuberosus *Solanum* species.**

*Curr. Sci.*, 1950, 19: 348, bibl. 3, illus.

The chromosome number of *Solanum seaforthianum*, *S. warszewiczii* and *S. verbascifolium* was found to be  $2n=24$ . The chromosomes resembled those of the tuberous group in many respects.—University of Durham.

1732. RUDOLF, W.

**IV. Methods and results of breeding resistant strains of potatoes.**

*Amer. Potato J.*, 1950, 27: 332-9, bibl. 9.

The following 6 wild species, showing combined resistance to late blight, virus diseases and colorado beetle, may be of great value in breeding: *Solanum demissum* [3 varieties], *S. polyadenium*, *S. antipoviczii*, *S. ajuscoense*, *S. verrucosum* and *S. chacoense*.—Max-Planck-Institute for Research in Plant Breeding, Voldagsen/Hanover, Germany.

1733. ROSS, H., AND BAERECKE, M.-L.

**III. Selection for resistance to mosaic virus (diseases) in wild species and in hybrids of wild species of potatoes.**

*Amer. Potato J.*, 1950, 27: 275-84, bibl. 13.

At the Max-Planck-Institute for research in plant breeding in Germany, virus X-immunity was found with certainty only in *Solanum acaule*, but Y-immunity was found in *S. chacoense*, *S. cordobense*, *S. garciae*, *S. catarthrum*, *S. macolae*, *S. ajuscoense*, *S. antipoviczii*, and *S. polyadenium*, and possibly also in *S. demissum*, *S. chaucha*, *S. rybinii* and *S. commersonii*. Virus A-immunity, while not yet determined, seems to be as general as Y-immunity. Only the species *S. chacoense* and the nearly related *S. catarthrum* and *S. andigenum* may possibly show leafroll-immunity.

1734. KAMMERMANN, N.

**Undersökningar rörande potatisbladmöglet, *Phytophthora infestans* (Mont.) de By.**

1. Metodologisk undersökning angående prövningen av potatisblastens resistens mot bladmöglet. (Investigations on potato blight. I. Methods of testing potato foliage for blight resistance.) [German summary pp. 5.]

*Medd. Växtskyddsanst. Stockh.* 57, 1950, pp. 41, bibl. 21.

In connexion with work on the breeding of blight-resistant potato varieties, methods of foliage testing had to be evolved which would permit rapid determination

of the blight resistance of a particular seedling. The following, among other, criteria were found useful in the evaluation of foliage resistance: The time lag between inoculation and sporangium formation by the fungus, the formation of aerial mycelium, and size and colour of the necrotic spots.

1735. TRULEVIČ, V. K.

**An experiment in the vegetative hybridization of potatoes. [Russian.]**

*Sad i Ogorod* (Orchard and garden), 1950, No. 12, pp. 61-3, illus.

By inserting the eyes of one variety, as scions, into the tubers of another, vegetative hybrids are produced [see *H.A.*, 19: 3197]. In the Soviet Far North, grafts grown in a cold frame at 12-16° C. have shown a considerably better take than those grown in the open. An illustrated description is given of a simple tool which cuts out the scions uniformly and thus simplifies the grafting technique.

1736. EDWARDS, G. R.

**New potato varieties.**

*J. Dep. Agric. S. Aust.*, 1950, 54: 74-5, illus.

Promising results were obtained from a trial with two new potato varieties, Monak and Moona, introduced from New South Wales. These, and the variety Kennebec introduced from the United States, are described.

**Propagation and planting.**

1737. EMILSSON, B.

**Inverkan på avkastningen av utsädespotatisens förgroning. (The effect of sprouting on potato yield.)** [English summary ½ p.]

*J. roy. Swedish Acad. Agric.*, 1950, 89: 315-39, bibl. 36.

In these trials, which were conducted with 12 varieties from 1945 to 1948, harvesting was carried out at 3 dates at intervals of about one month. Sprouting was found to increase yields up to 89% when the crop was lifted early, the late varieties giving the most favourable response. In early and early maincrop varieties the treatment increased yields only in the case of early lifting, while it caused losses up to 36% in the case of a late harvest. An increase in yield resulting from the treatment was associated with an increase in tuber size as well as of starch and dry matter content. From these results it is concluded that sprouting is desirable for all areas with a short growing season. The physiology of the sprouting process and its effect on yield is discussed at some length.—Inst. for Plant Research and Cold Storage, Nynäshamn, Sweden.

1738. EMILSSON, B., AND GUSTAFSSON, N.

**Lagringsbetingelsernas inverkan på utsädespotatisens produktionsförmåga. (The influence of storage conditions on the productivity of seed potatoes.)** [English summary 1 p.]

*J. roy. Swedish Acad. Agric.*, 1950, 89: 398-419, bibl. 15.

In preliminary trials with 7 varieties the effects of 1, 2 and 3 de-sproutings on the germination of seed potatoes were observed. Comparisons were also made



between green-sprouted seed, and seed stored at 0°, 5°, and 10° C., the main varieties used being Bintje, Up-to-date, Arran Consul and President. The potatoes were harvested at two stages at an interval of one month. The following are some of the results obtained. (1) Green-sprouted seed produced the earliest crop, followed by seed stored at 10° C. and de-sprouted once. (2) Storage at 0° C. generally reduced yield, especially in the early harvested plants. (3) With early harvesting, green-sprouting increased yield considerably in all varieties except Bintje. (4) The average tuber size at harvest was smallest after storage at 0° C. and storage at 10° C. de-sprouted twice, largest after green-sprouting and storage at 10° C. de-sprouted once. Judged as a whole the results indicate that the storage temperature of seed potatoes influences development and yield mainly through its effect on the development of the sprout.—Inst. for Plant Res. and Cold Storage, Nynäshamn, Sweden.

1739. BODE, O.

Untersuchungen zur Unterbrechung der Keimruhe bei Kartoffeln. (Studies on breaking the dormancy of potatoes.)

NachrBl. dtsch. PflSchDienst., Braunschweig, 1950, 2: 183-6, bibl. 4.

The "rindite" mixture (ethylene chlorohydrin+ethylene dichloride+carbon tetrachloride in a 7:3:1 ratio at the rate of 0.5 c.c. per 1 kg. of tubers) is recommended as being safer and simpler to handle than ethylene chlorohydrin alone, although the latter was slightly more effective. Tabulated results of the sprouting percentages of the 20 varieties tested are included.

#### Cultivation and nutrition.

(See also 1551, 1579, 1584, 1589, 1590, 1591, 1612, 2164.)

1740. LORENZ, O. A.

Air and soil temperatures in potato fields, Kern County, California, during spring and early summer.

Amer. Potato J., 1950, 27: 396-407, bibl. 12.

Air and soil temperatures were determined in potato fields, in Kern County, California, during the spring months of 1945, 1946, and 1948. Soil temperature at the 6-inch depth averaged about 60° F. in early April, 65° F. in May, and 70° F. in June. During April, the soil averaged several degrees above that of the air, whereas the reverse was true during June. Diurnal fluctuations in planted beds often were more than 20° F. at the 3-inch depth, whereas comparable fluctuations at the 6-inch depth were less than 15° F., and less than 8° F. at the 9-inch depth. Shading the soil by good foliage growth accounted for a cooling of about 8°, as compared with fallow beds. Completely shaded beds averaged about 10° cooler than fallow beds. On the average, irrigated beds were about 4° cooler at the 6-inch depth than those unirrigated. [Author's summary.]

1741. BAUMANN, H.

Wasserhaushalt der Pflanze und des Bodens in wasserwirtschaftlicher Betrachtung. (Water economy of the plant and soil as related to the water supply.)

Z. PflErnähr. Düng., 1950, 49: 71-82, bibl. 23.

The water consumption of plants is not related to the quantity of plant material produced, as fertilized potatoes and barley with high yields used up only slightly more water than unfertilized, low-yielding crops. The total water consumption of plants is determined by rainfall during the growing period and above all by the supply of water in the soil. The transpiration coefficient fluctuates greatly and is not suitable for calculating the agricultural water requirement.

1742. WRIGHT, L. E., SCHURMAN, D. C., AND ATKINSON, H. J.

Soil fertility studies. II. Manure and fertilizers for potatoes at Charlottetown, P.E.I.

Sci. Agric., 1950, 30: 447-55, being Sci. Contr. Div. Chem. Ottawa 183.

The experiment described has run for 22 years, and potatoes were grown either continuously or in a 3-year rotation with clover and wheat or barley. Manurial treatments (applied to the potatoes) were farmyard manure at 15 tons per acre, 4-8-8 fertilizer at 1,000 lb. per acre with N supplied in one case as nitrate of soda and in another as sulphate of ammonia, and two treatments using half the above quantities of farmyard manure and fertilizer together. After 14 years, lime was applied annually to part of each plot at the rate of 1 ton per acre. For the last four years another part of each plot received a double quantity of manure. The yields of potatoes were consistently higher when grown in rotation than when grown continuously. Use of lime consistently increased the yield in all plots. Among the manurial treatments F.Y.M. gave the highest yields, though nearly as high yields were obtained from the plots receiving half F.Y.M. and half fertilizers containing nitrate of soda. Fertilizers containing sulphate of ammonia gave very poor yields when applied without lime or without F.Y.M. Lime had its most marked effect when applied to part of the plot which had received sulphate of ammonia for 14 years. Double fertilizer applications gave further yield increases with the potatoes and clover but not with the barley. F.Y.M. increased the organic matter level of the soil and the  $P_2O_5$  and exchangeable base content. Lime increased the pH, Ca and  $P_2O_5$  values. Sulphate of ammonia reduced the pH and Ca values.

C.W.S.H.

1743. DUNTON, E. M., Jr., BELL, F. W., AND TAYLOR, M. E.

The influence of acid-forming and neutralized fertilizers on the soil reaction and nutrient level in the Irish potato row during the growing season.

Agron. J., 1950, 42: 512-15, bibl. 5, being Pap. J. Ser. Va Truck Exp. Stat. 101.

Both acid and neutral fertilizers have been used in bands 2 inches to the side of, and  $\frac{1}{2}$ -1 inch below, the seed potatoes. In view of the connexion between soil reaction and scab development, studies were made on the effect of acid-forming fertilizer material, both alone and mixed with limestone, on the soil reaction during the growing season. Experiments showed that the fertilizer used, a commercial 5-10-5 material requiring 200 lb. limestone per ton to render it neutral, lowered

the soil pH as the growing season proceeded, particularly in the soil above the bands. The addition of limestone to the fertilizer was not effective in preventing the acidifying effect of the fertilizers on the soil 2 inches or more from the bands. The movement of N, K, P and Ca from the bands was also traced. The results showed that the roots and tubers of a single plant were exposed to a soil with a wide range of pH and nutrient concentration. C.W.S.H.

1744. RIETHUS, H.

Der Einfluss verschiedener Düngungen auf den Ernteertrag und einige Qualitätsmerkmale von Kartoffeln. (The influence of various fertilizers on the yield and quality of potatoes.)

*Z. Pflernähr. Düng.*, 1950, 51: 66-71.

In trials at Humboldt University, Berlin, both yield and starch content were highest in potatoes receiving full fertilizer treatment, i.e. NPK+stable manure. Plots receiving stable manure only, produced lower yields with a lower starch content. During storage, however, their starch content decreased only slightly, and after 8 months exceeded that found in fully fertilized potatoes. These experiments confirmed earlier results where it was found that the loss of starch in stored potatoes from fully fertilized plots was due to high amylase and respiration enzyme activity.

1745. KUNKEL, R., GARDNER, R., AND BINKLEY, A. M.

Results of fertilizer trials on potatoes in the San Luis Valley.

*Amer. Potato J.*, 1950, 27: 309-18, bibl. 6.

Fertilizer studies, using N,  $P_2O_5$  and  $K_2O$  singly and in combination were conducted on 18 localities in Colorado. In general potato yields were markedly increased by the use of commercial fertilizers. The major increases in yield resulted from the use of N and  $P_2O_5$  at the rate of 40 and 160 lb. per acre (40-160-0), respectively. The increase in yield attributed to potash is questionable. The colour, grade and specific gravity of the tubers were influenced less by fertilizers than by the differences in environmental factors between growing seasons. [From authors' summary.]

1746. ELLIS, T. O.

Fertilizer experiments on Irish potatoes 1947-1948.

*Bull. Dep. Agric. Jamaica* 40 (n.s.), 1950, pp. 31, bibl. 2, map, 1s. 3d.

A series of 8 experiments was carried out to study the qualitative and quantitative responses of potatoes to fertilizer treatments in the various potato-growing districts of Jamaica. Significant beneficial effects on yield were obtained from K at 3 sites and from P at 5 sites. Where responses to P were obtained, there was a net advantage in favour of local phosphate as compared with 18% superphosphate. No response to N was obtained. The responses obtained on the individual sites are presented diagrammatically. In all cases where K improved yield, quality was also improved; with P, the reverse was generally the case. The responses obtained are discussed with reference to soil type. Attention is drawn to the danger of applying complete fertilizer mixtures to the potato crop.

1747. VIETS, F. G., Jr.

Effect of rate of nitrogen application upon a sudan grass green manure crop and its influence upon the yield and nitrogen requirement of potatoes.

*Agron. J.*, 1950, 42: 537-42, bibl. 6.

In experiments carried out on two irrigated virgin desert soils in Oregon and Washington States, nitrogen was supplied at levels of 0 to 120 lb. per acre to both sudan grass and a succeeding potato crop. On one soil potatoes were also planted without a prior sudan grass crop. These soils contained less than 1% organic matter and low total nitrogen. It was thought that the sudan grass might check wind erosion and, with adequate N manuring, increase soil humus. Nitrogen increased the yield and N content of the sudan grass, but with less than a total of 120 lb. N for the two crops, the highest potato yields were obtained if all the N was applied to the potatoes. The sudan grass was only utilized if high N applications were also made to meet the requirements of both the potatoes and soil organisms. Low applications to the sudan grass produced lower yields of potatoes than no application, and well manured potatoes yielded as well on virgin plots as on plots which had grown sudan grass. Although it is admitted that these are only "short-term" results, it is considered that for new lands the use of sudan grass is not justified except where wind erosion is an important factor. C.W.S.H.

1748. FREDRIKSSON, L., AND WIKLANDER, L.

Studier över potatisens fosfatupptagande med tillhjälp av radioaktiv fosfor. (The use of radioactive phosphorus in the study of phosphorus uptake by potatoes.) [English summary ½ p.]

*J. roy. Swedish Acad. Agric.*, 1950, 89: 446-59, bibl. 13.

Superphosphate tagged with radioactive phosphorus was applied by two methods to a sandy loam poor in available phosphorus. Analyses of the plant samples taken at flowering time showed that when granulated superphosphate was broadcast and harrowed down, the increase in the rate of applied phosphorus resulted in an increase in growth and in total phosphorus in the plant. The relative uptake of phosphorus from the fertilizer varied between 22% and 64% of total uptake. When the same kind of superphosphate was placed along the row, 5 cm. underneath the seed potatoes, increased application resulted in an increase in phosphorus uptake from the fertilizer but a decrease in phosphorus uptake from the soil. Band placement resulted in a higher relative uptake of fertilizer phosphorus than did broadcasting. The percentage of applied phosphorus utilized was very low, amounting to only 4.4% to 11.9%.

1749. STANTON, W. R., AND SINCLAIR, W. K.

Effect of high concentration of phosphorus-32 on growth of the potato.

*Nature*, 1951, 167: 234-5, bibl. 4.

Studies on the use of phosphorus-32 for the production of somatic mutations in the potato require a knowledge of the amount of active material which, as part of the nutrient solution, would produce toxic effects at the growing points. Experiments showed that about



100  $\mu$ C. of the material must be administered to produce an observable effect, about 20% being taken up by the plant. The concentration of phosphorus-32 in the growing point appears to be about 6 times that of the average concentration level in the plant. Doses of the order of 3,000 r. were received by the growing point in the first fortnight following treatment with 100  $\mu$ C.—John Innes Horticultural Inst. and Royal Cancer Hospital, London, S.W.3.

1750. JACOB, W. C., AND DEAN, L. A.  
The utilization of phosphorus by two potato varieties on Long Island.

*Amer. Potato J.*, 1950, 27: 439-45, bibl. 3.

The varieties Irish Cobbler and Green Mountain were used in trials, the results of which agreed fairly well with previous work [see *H.A.*, 19: 3211]. The percentage P in the potato plant derived from fertilizer increased with higher rates of application. Irish Cobbler plants contained a higher proportion of fertilizer P at the end of the season than did Green Mountain. Less than 5% of  $P_2O_5$  applied to the crop was utilized by the plants. No significant yield responses to the fertilizer were noted with either variety.—Cornell University.

1751. DE WILLIGEN, A. H. A.  
Conductivity and buffer capacity of potato juice as correlated with potassium supply to the plant.

*Plant and Soil*, 1950, 2: 405-17, bibl. 3.

Electrolytic conductivity and buffer capacity of the press juice of the potato tuber are almost exclusively determined by the potassium supply to the plant and by the form in which the potassium fertilizer is given (especially in respect of the chlorine uptake of the plant). [Author's summary.]—Exp. Stat. for the Industrial Use of the Potato, Groningen, Holland.

1752. FULTS, J. L., AND OTHERS.  
Stabilization and intensification of red skin color in red McClure potatoes by use of the sodium salt of 2,4-dichloro-phenoxyacetic acid.

*Amer. Potato J.*, 1950, 27: 377-95, bibl. 33, being *Sci. Ser. Pap. Colo. agric. Exp. Stat.* 323.

Results obtained support those previously published for Bliss Triumph [see *H.A.*, 19: 447], namely, that the sodium salt of 2,4-D, used either as side dressing, as a spray at the base of the plants, in irrigation water, or as a plant spray, increased red skin colour in Red McClure without reducing yields.

### Metabolism, growth and composition.

(See also 1257, 1744, 1789c, d.)

1753. SOKOLOVA, V. E., AND SAVELJEVA, O. N.  
The special metabolism and length of growth period of different varieties of potatoes. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 70: 671-3, bibl. 3.

A comparison of the temperature relations with reference to starch formation in two varieties of

potatoes, Lorch and Epron. The curves obtained showed marked differences for the two varieties. The results indicate that the length of the growing period of a variety depends on the degree of correlation between the temperature of the environment in which it is growing and that of the temperature regime to which it is adapted.

1754. BARRON, E. S. G., AND OTHERS.  
The metabolism of potato slices.

*Arch. Biochem.*, 1950, 28: 377-98, bibl. 45.

The studies presented here are the outgrowth of a long-standing interest of one of the authors (G. K. K. Link) in the metabolic disturbances of the potato tuber known as "black heart". The understanding of the mechanism of this alteration required some knowledge of the metabolic activities of the normal potato, the following of which were investigated: Respiration of potato slices, the fermentation of carbohydrate, the oxidative pathway of the carbohydrate metabolism, and the synthesis of citric acid.—University of Chicago.

1755. MAMONTOVA, A. N.  
The effect of grafting on the qualitative modifications of albuminous substances of scion and rootstock. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 70: 899-900.

From grafting experiments with tomato on potato and potato on tomato it was found that a qualitative modification of albuminous substances occurs in the scion and rootstock as a result of their reciprocal effect.

### Virus diseases.

(See also 1727, 1733, 1789d, 1801, 1802, 2148.)

1756. BROADBENT, L., GREGORY, P. H., AND TINSLEY, T. W.  
Roguing potato crops for virus diseases.

*Ann. appl. Biol.*, 1950, 37: 640-50, bibl. 10.

Attempts to reduce the spread of leaf roll and of rugose mosaic (potato virus Y) by roguing have, in the course of 6 years' trials, been only occasionally effective. It was clear that most of the spread of the viruses occurred before the symptoms were recognized, and it is therefore considered that roguing in south and east England is economically not worth while.—Rothamsted exp. Stat. C.W.S.H.

1757. VON BERNUTH (FRAU).  
Virusbekämpfung in der Kartoffelzucht. (Virus control in potato growing.)

*Z. PflKrankh.*, 1949, 56: 374-9, bibl. 4 [received 1951].

Potato viruses, their recognition and the use of indicator plants for this purpose are discussed, and measures for avoiding new infection, particularly by early planting, are described.

1758. KÖHLER, E.  
Zum Nachweis von Kartoffelvirosen im Testpflanzenverfahren. (Test plants for potato viruses.)

*NachrBl. dtsch. PflSchDienst.*, Braunschweig, 1951, 3: 25, illus.

The following plants were used at the Celle Virus Research Station for the identification of virus diseases:

*Gomphrena globosa* for virus X and tobacco ringspot virus, *Solanum demissum* for virus A and X, *Datura stramonium* for tobacco ringspot virus, and Samsun tobacco for virus Y.

1759. BROADBENT, L.

The correlation of aphid numbers with the spread of leaf roll and rugose mosaic in potato crops.

*Ann. appl. Biol.*, 1950, 37: 58-65, bibl. 10.

Experiments showed a correlation of leaf roll spread with the number of alate *Myzus persicae* trapped. Spread of rugose mosaic (potato virus Y) was correlated to a lesser degree. Dispersing infected plants gave higher correlations, in both cases, than placing them in one row in the healthy crop. The trap data makes it possible to predict the health of potato stocks in the following year.—Rothamsted exp. Stat. C.W.S.H.

1760. BROADBENT, L., CHAUDHURI, R. P., and KAPICA, L.

The spread of virus diseases to single potato plants by winged aphids.

*Ann. appl. Biol.*, 1950, 37: 355-62, bibl. 8.

Potato plants in pots placed in the open near potato plots for limited periods at intervals during the summer only became infested by winged aphids in warm, calm and dry weather. Most of the potted plants became infected with virus in July when the aphids were leaving the plots, and not earlier in the year when infection was spreading within the field plots.—Rothamsted exp. Stat. C.W.S.H.

1761. RÖNNEBECK, W.

Über die Frühjahrsentwicklung der grünen Pfirsichblattlaus (*Myzodes persicae* Sulzer) am Primärwirt im Hinblick auf ihre Bedeutung als Virusüberträger im Kartoffelfeld. (The spring development of the green peach aphid (*Myzus persicae* Sulzer) on the primary host in relation to its importance as a vector of potato viruses.)

*Z. PflKrankh.*, 1950, 57: 351-7, bibl. 6.

Observations are recorded on the time of hatching, the number of generations and the flight periods of the peach aphid. Between 40% and 55% eggs hatched. Around Bonn there were 3 fundatrix generations, in other places, at high altitudes, only 2. After the flight of the 3rd fundatrix generation peaches were free from aphids. The control of virus infection in potatoes involves spraying at the chief flight period, from the middle of June to the end of July, and winter spraying the peaches to destroy the aphid eggs, "Paranicrol" 4% being recommended.—Bonn University.

1762. KASSANIS, B.

Heat inactivation of leaf-roll virus in potato tubers.

*Ann. appl. Biol.*, 1950, 37: 339-41, bibl. 11.

When potato tubers were stored at 37-5° C. in a humid atmosphere, some lost their germinating power after 20 days but others survived up to 40 days. All tubers infected with leaf-roll virus that survived 25 days at this temperature produced healthy plants. Similar treatments up to 40 days did not free tubers from potato viruses X and Y. [Author's summary.]—Rothamsted exp. Stat.

1763. STAPP, C., AND BARTELS, R.

Über den Einfluss von Keimhemmungsmitteln auf den serologischen X-virusnachweis in Kartoffeldunkelkeimen. (The influence of sprout inhibitors on the serological determination of virus X in potato sprouts.)

*NachrBl. dtsh. PflSchDienst.*, Braunschweig, 1950, 2: 186-7, bibl. 3.

Seed potatoes treated with 2 sprout inhibitors (one based on phenyl urethane, the other on the isopropyl ester of carbanilic acid) were successfully used, after the removal of the chemicals, for virus X-determination by the dark sprouting method. Though the trials were carried out only on 2 varieties it is presumed that other varieties would react similarly.

1764. LOMBARD, P. M.

The effect of a mild strain of latent mosaic virus X on yield of some of the new potato varieties in Maine.

*Amer. Potato J.*, 1950, 27: 445-9, bibl. 7.

In an experiment with the varieties Chippewa, Sequoia, Sebago and Teton, seed stock carrying a mild strain of virus X and stock free from virus X were compared with commercial stock for each variety. Both mild-X and commercial seed gave reduced yields compared with virus-free stock. The reduction in yield varied between the varieties.

1765. OSWALD, J. W.

A strain of the alfalfa-mosaic virus causing vine and tuber necrosis in potato.

*Phytopathology*, 1950, 40: 973-91, bibl. 16, illus.

A disease first observed in 1946 in California causing severe vein, leaf, shoot and tuber necrosis in the White Rose potato variety is described and named the tuber-necrosis virus. The virus is tuber-perpetuated and easily transmissible by mechanical juice inoculation. The disease usually occurs in the margins of potato fields adjacent to alfalfa plantings and is frequently associated with the calico disease of potato. The virus is considered to be a strain of the alfalfa-mosaic virus that is characterized by its ability to cause haulm and tuber necrosis.

### Fungous and bacterial diseases.

(See also 1459, 1713, 1734, 1787.)

1766. CALLBECK, L. C.

Further studies on copper sulphate-lime ratios in bordeaux mixture.

*Amer. Potato J.*, 1950, 27: 327-31, bibl. 10, being *Contr. Div. Bot. Plant Path., Sci. Serv., Dep. Agric., Ottawa* 1030.

Studies conducted on Prince Edward Island during 1947 and 1948 confirmed earlier findings [see *H.A.*, 18: 415]. In both seasons, though they were very different as regards climatic and disease conditions, the highest yields of potatoes were obtained from plots treated with bordeaux mixture having a copper sulphate-lime ratio of 2:1. Late blight tuber rot data from 1943 to 1948, inclusive, indicate that a low-lime bordeaux mixture is more effective than a high-lime mixture in controlling tuber rot, the ratio of losses from



plots treated with 4-1-40, 4-2-40, 4-3-40 and 4-4-40 bordeaux mixture being 1:3:4:6.

1767. EMILSSON, B., AND GUSTAFSSON, N.  
Undersökningar beträffande bekämpning  
av bladmögel och brunröta hos potatis.  
V. Försök med blastdödande medel under  
år 1949. (Studies on blight control in  
potatoes. V. Trials with haulm-killing  
chemicals in 1949.\*) [English summary  $\frac{1}{2}$  p.]  
*J. roy. Swedish Acad. Agric.*, 1950, 89:  
130-52, bibl. 10.

In renewed trials with Ewos 936, carried out on 13 farms, the haulms were killed satisfactorily in 7 cases and fairly satisfactorily in 3 cases. The best results were obtained when the haulms were moderately developed or maturing. In the 3 cases where the treatment failed, high-pressure spraying machines had been used delivering only 500-800 l./ha. The possibility of applying 10% sulphuric acid for haulm destruction is discussed. The effect of the treatment on yield and quality was similar to that recorded the previous year. Further observations show that starch and dry matter contents in the tubers increase as haulm-killing is delayed, and that the skin becomes more resistant to mechanical injury the longer the tubers are left in the ground after spraying. The better development of the skin resulting from the treatment appears to reduce water losses in storage.—*Inst. for Plant Research and Cold Storage, Nynäshamn, Sweden.*

1768. HOOKER, W. J., AND KENT, G. C.  
Sulfur and certain soil amendments for  
potato scab control in the peat soils of  
Northern Iowa.  
*Amer. Potato J.*, 1950, 27: 343-65, bibl. 45,  
illus., being *J. Pap la agric. Exp. Stat. J.*-  
1791.

Among compounds tested as soil treatments between 1941 and 1950 to control common scab (*Streptomyces scabies*) on calcareous peat soils, sulphur and ammonium sulphate were the most effective. At one location 4,000 lb. of sulphur per acre was required for commercial control, whereas at another 2,000 lb. was effective. As the hydrogen-ion concentration of these soils was increased, scab indices were reduced. Applying sulphur in the furrows and mixing it thoroughly with the soil was more effective than broadcast applications. Application in bands through the fertilizer attachment of the planter was not satisfactory. Ammonium sulphate when applied in the furrow was approximately equal to sulphur in controlling scab; aluminium sulphate, on the other hand, was found ineffective and may even have increased scabiness. Certain varieties also showed yield responses following sulphur treatment. A leaf-roll symptom present in many seed lots was partially alleviated by sulphur applied in the furrow.

1769. STAPP, C.  
Die Bakterienringfäule der Kartoffel und  
ihre erneute Beachtung in Deutschland.  
(The bacterial ring rot of potato and its  
possible reappearance in Germany.)  
*Z. PflKrankh.*, 1949, 56: 81-92, bibl. 95  
[received 1951].

\* For preliminary trials, see *H.A.*, 18: 2788 and 19: 2245.

This disease, caused by *Corynebacterium sepedonicum*, has not been seen in Germany since 1930, but as it is prevalent in America and occurs in northern Europe its re-introduction into Germany is possible. The organism and the symptoms of the disease are described, and control measures are discussed in a general review of the literature.

1770. SMITH, W. L., Jr.  
Pathogenic differences manifested by *Erwinia atroseptica* and *Erwinia carotovora*.  
*Phytopathology*, 1950, 40: 1011-17, bibl. 6.

*Erwinia atroseptica* causes a soft rot of potato tubers, and blackleg symptoms on growing plants. *E. carotovora* causes a soft rot of potato tubers, but does not cause blackleg. *E. atroseptica* may be transmitted from diseased to healthy tubers on a knife used in cutting seed pieces, but no infection of potato plants resulted when seed pieces were inoculated with *E. carotovora* by means of a cutting knife.

### Nematodes.

(See also 1789a, b.)

1771. SEINHORST, J. W.  
De betekenis van de toestand van de grond  
voor het optreden van aantasting door het  
stengelaaltje (*Ditylenchus dipsaci* (Kühn)  
Filipjev). (Soil conditions and stem eel-  
worm disease.) [English summary 2 $\frac{1}{2}$  pp.]  
*Tijdschr. PLZiekt.*, 1950, 56: 291-348, bibl.  
19, illus.

A detailed account is given of field observations and of pot and field experiments with stem eelworms, *Ditylenchus dipsaci*, obtained from rye, red clover and potatoes. Peas and beans (*Phaseolus*) are also mentioned as hosts. Apparatus for the extraction of large numbers of eelworms from infested plants was constructed. High soil moisture content is favourable to infection. At high temperatures the eelworms are less active in the soil than at low ones.

1772. FELDMESSER, J., AND FASSULIOTIS, G.  
Reactions of the golden nematode of potatoes,  
*Heterodera rostochiensis* Wollenweber, to  
controlled temperatures and to attempted  
control measures.  
*J. Wash. Acad. Sci.*, 1950, 40: 355-61,  
bibl. 17, illus.

In studies on Long Island, N.Y., winter cysts of the golden nematode, *Heterodera rostochiensis*, kept at about 40° F. were much less susceptible to methyl bromide fumigation and hot water treatment than summer cysts kept at 70° F. This result suggests a possible reason why soil fumigation against cyst-forming nematodes has proved more effective in late summer or early autumn than in the spring. When larvae within cysts were exposed to sub-lethal control measures there was a tendency for the hatching response in potato-root leachings to be inhibited for one or more weeks. When larvae were subjected to controlled temperatures during the winter it was found that they would hatch out at 40° F. when exposed to potato-root leachings and to tap water for 16 hours. Larvae from cysts removed from the field during January hatched

out under greenhouse conditions and infected potato roots.

1773. GOFFART, H.  
Methoden zur Untersuchung von Böden auf Kartoffelälchen. (Methods of examining soils for potato eelworms.)  
*NachrBl. dtsh. PflSchDienst., Braunschweig*, 1951, 3: 25-7, illus.

An account is given of methods for the qualitative and quantitative determination of nematodes in soils, with particular reference to the potato eelworm, *Heterodera rostochiensis*.

# *Insect pests.*

(See also 2170.)

1774. EDWARDS, G. R.  
Insect pests of vegetable crops. Section II.  
Insect pests of potatoes.  
*J. Dep. Agric. S. Aust.*, 1950, 54: 19-24, illus.

Descriptions with notes on control of potato moth (*Gnorimoschema operculella*), potato aphids (*Macrosiphum solanifolii* and *Myzus persicae*), Rutherglen bug (*Nysius vinitor*), leafhoppers (*Jassidae*), crickets (*Gryllidae*), grasshoppers (*Acrididae*), eelworm (*Heterodera* sp.), cutworms (*Noctuidae*), brown vegetable weevil (*Listroderes costirostris*), black beetle (*Heteronychus sanctae-helenae*), and slugs.

1775. PETERSON, A. G.  
Insecticide experiments on potatoes in Minnesota during 1949.  
*Amer. Potato J.*, 1950, 27: 319-26, being *Pap. Sci. J. Ser. Minn. agric. Exp. Stat.* 2563.

Owing to low aphid populations during the season, no conclusive results were obtained from spray and dust experiments designed primarily to compare the aphidicidal effectiveness of different formulations of DDT and several new insecticides with a standard 5% DDT dust and 1% parathion. Potato flea beetles, *Epiditrix cucumeris*, were satisfactorily controlled by standard formulations of DDT, though it appears that DDT dust plus 1% Sovaspray No. 1 oil may be somewhat superior to DDT alone. It was confirmed that 1% parathion was not so effective as DDT in controlling the six-spotted leaf hopper, *Macrosteles divisus*. The potato leaf hopper, *Empoasca fabae*, was controlled by all formulations of DDT.

1776. HEINZE, K.  
Über Blattlausschäden an Kartoffeln.  
(Aphid injury to potatoes.)  
*Z. PflKrankh.*, 1950, 57: 106-8, illus.

An account of the damage to potato foliage caused by *Doralis* [*Aphis*] *fabae* (the bean aphid) and by *Aulacorthum* [*Myzus*] *pseudosolani*. The punctures of the latter resemble the symptoms of potato virus A.

1777. KOENIG, P., AND KOELLE, G.  
Solanaceen als Wirtspflanzen des Kartoffelkäfers. (Solanaceous plants as hosts for the colorado beetle.)  
*Z. PflKrankh.*, 1950, 57: 172-7, bibl. 5.

The hosts of the colorado beetle are discussed, and listed in order of their degree of infestation.

1778. KLEIN-KRAUTHEIM, F.  
Über die Überwinterung des Kartoffelkäfers (*Leptinotarsa decemlineata* Say) und sein Erscheinen im Frühjahr in seinen Beziehungen zu meteorologischen Faktoren. (The hibernation of the colorado beetle and its emergence in the spring in relation to climatic factors.)  
*NachrBl. dtsh. PflSchDienst., Braunschweig*, 1950, 2: 161-5, bibl. 10, illus.

In trials conducted by the Institute for Colorado beetle Research and Control, Darmstadt, it was found that sandy loam is the most favourable soil type for the hibernation of colorado beetles, pure sand less so, and soil with a high organic matter content the least favourable. Most of the overwintering beetles emerged from the sandy loam between 16 and 25 May when the soil temperature at a depth of 50 cm. was 16.6° C. This temperature is considered to be the critical one for mass emergence.

1779. SCHWARTZ, E.  
Die Prüfung chemischer Bekämpfungsmittel gegen den Kartoffelkäfer im Jahre 1949. (Tests of insecticides for colorado beetle control in 1949.)  
*NachrBl. dtsh. PflSchDienst., Berlin*, 1950, 4: 214-17.

Of 52 preparations tested in the laboratory of the Colorado beetle Research Station at Mühlhausen, Thuringia, 5 were selected for field trials in 1950. Three of these insecticides were based on DDT, 1 on BHC, and 1 on a mixture of DDT and BHC.

1780. BOBACK, A. W.  
Vogelschutz gegen Kartoffelkäfer ? (Colorado beetle control by birds.)  
*NachrBl. dtsh. PflSchDienst., Berlin*, 1950, 4: 217-18.

Observations suggest that starlings, crows, partridges, pheasants, redstarts and the domestic turkey may be useful in the biological control of colorado beetle and should be encouraged.

1781. LANGENBUCH, R.  
Fütterungsversuche an Jungamseln mit Vollkerfen und Larven des Kartoffelkäfers. (Feeding trials on young blackbirds with adults and larvae of the colorado beetle.)  
*NachrBl. dtsh. PflSchDienst., Braunschweig*, 1950, 2: 177-80, bibl. 11, illus.

Caged young blackbirds (*Turdus merula*) showed a definite dislike of colorado beetle larvae when these were fed either alone or with other food. None of 14 insectivorous species of birds found in the neighbourhood of the Darmstadt Colorado beetle Research Institute nor hens let loose in infested potato fields were observed to feed on the adult beetles or larvae.

1782. PETERSON, A. G., AND GRANOVSKY, A. A.  
Relation of *Empoasca fabae* to hopperburn and yields of potatoes.  
*J. econ. Ent.*, 1950, 43: 484-7, bibl. 18, being *Pap. sci. J. Ser. Minn. agric. Exp. Stat.* 2546.

Observations on injury to potatoes caused by different populations of *Empoasca fabae* indicate a close straight-line relationship between nymph populations and



per cent. hopperburn. The relations of yield to nymph density and per cent. hopperburn were best expressed by logarithmic curves. Relatively great yield reductions resulted from low leafhopper densities, and with further increases in leafhopper populations the yield reductions became proportionally less great. *E. fabae* injury appeared to have little, if any, adverse effect on the subsequent yielding ability of tubers from affected plants. [Authors' summary.]

1783. PETERSON, A. G., AND GRANOVSKY, A. A.  
Feeding effects of *Empoasca fabae* on a resistant and susceptible variety of potato.  
*Amer. Potato J.*, 1950, 27: 366-71, bibl. 4, illus., being *Pap. sci. J. Ser. Minn. agric. Exp. Stat.* 2559.

Histological observations on Cobbler and Sequoia indicate that leafhopper feeding has a more severe effect on phloem and adjacent parenchyma in Cobbler; there is more breakdown and disorganization of cells and greater masses of red-staining necrotic tissues. Severe plasmolysis and disintegration of plastids observed in the later stages of injury in Cobbler were not found in Sequoia. It appears that varietal differences in leafhopper feeding may involve both morphological and physiological characteristics. [From authors' conclusions.]

#### *Effects of insecticides on potatoes.*

1784. RODRIGUEZ, J. G., AND GOULD, W. A.  
Effect of technical benzene hexachloride and lindane on the flavor of tomatoes and potatoes.  
*J. econ. Ent.*, 1950, 43: 498-503, bibl. 6.

New formulations of BHC and lindane were tested on tomatoes and potatoes grown in acid and alkaline soils in greenhouses at the Ohio Agricultural Experiment Station. The pH value of the soil had no influence on the taste of either crop. Definite off-flavour was detected in both tomatoes and potatoes treated with technical BHC, while those treated with lindane, though showing a slight off-flavour, were not significantly different from the untreated checks. Residue analyses suggested a strong correlation between amount of residue and flavour contamination.

#### *Storage.*

(See also 1682, 1726, 1730, 1738, 1739, 1763, 1789e.)

1785. SPARKS, W. C.  
Injury studies on Idaho grown Russet Burbank potatoes. Part I. Shipping and handling.  
*Amer. Potato J.*, 1950, 27: 287-303, bibl. 6, illus., being *Res. Pap. Idaho agric. Exp. Stat.* 312.

A preliminary shipping test to Los Angeles from Idaho indicated that considerable injury to potatoes was occurring after the potatoes were placed on rail. It was found that the protection afforded by various types of containers differed considerably. Injuries that occurred before shipping did not become readily apparent until the tubers had been stored for some time, and the need for shipping only undamaged tubers is therefore stressed. Another shipment to

Kansas City also revealed differences in the protective value of the containers used, but these were not significant owing to variations between the samples. Injury occurred each time the potatoes were handled.

1786. PERRY, A. L., AND MERCHANT, C. H.  
The development of defects in potatoes between shipping points in Aroostook County, Maine and wholesale and retail markets in Boston, Massachusetts.  
*Bull. Me agric. Exp. Stat.* 484, 1950, pp. 35, bibl. 4, illus.

Potatoes were examined before transport and again after their arrival at the market, and the increase in defects assessed. It is concluded that more care should be taken in grading to obtain greater uniformity of quality as measured by grade defects. The need is emphasized for potatoes to be well within grade when packed and for careful handling prior to packing to avoid fresh bruising which may be undetected at the time but will develop into grade defects *en route* to market.

1787. JONES, D. R., AND DOWSON, W. J.  
On the bacteria responsible for soft rot in stored potatoes, and the reaction of the tuber to invasion by *Bacterium carotovorum* (Jones) Lehmann & Neumann.  
*Ann. appl. Biol.*, 1950, 37: 563-9, bibl. 12, illus.

*Bacterium carotovorum* and *Pseudomonas syringae* were the only gram-negative bacteria found in rotting potatoes in clamps during 1945-7. Species of *Clostridium* gram-positive anaerobic bacilli, were found associated with *B. carotovorum*. The tuber reacted to *B. carotovorum* by producing a barrier of suberized cells, the production of which was favoured by low temperatures and humidity. C.W.S.H.

1788. HUNTER, A. S., AND TALLEY, E. A.  
Acid hydrolysis of potatoes under pressure.  
*Amer. Potato J.*, 1950, 27: 425-38, bibl. 10.

From tests described it is concluded that the acid hydrolysis of potatoes does not appear promising as a method of processing cull and surplus potatoes for storage or transport.

#### *Noted.*

1789.  
a ANSCOMBE, F. J.  
Soil sampling for potato root eelworm cysts. A report presented to the conference of advisory entomologists.  
*Ann. appl. Biol.*, 1950, 37: 286-95, bibl. 9.  
b MINISTRY OF AGRICULTURE, LONDON.  
Potato tuber eelworm.  
*Adv. Leaflet, Minist. Agric. Lond.* 372, 1950, pp. 3, illus., 1d.  
c PROKOŠEV, S. M., AND PETROČENKO, E. I.  
The content and metabolism of citric and malic acids in potato tubers. [Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1950, 74: 983-6, bibl. 7.

d SCHUPHAN, W.

Ein Beitrag zum N-Haushalt gesunder und viruskranker Kartoffelknollen unter besonderer Berücksichtigung des Gehaltes an exogenen Aminosäuren. (The N-metabolism of healthy and virus-infected potato tubers with particular reference to their exogenous amino-acids content.) *Z. PflKrankh.*, 1950, 57: 321-7, bibl. 18.

e Terman, G. L., Goven, M., and Cunningham, C. E.

Effect of storage temperature and size on French fry quality, shrinkage and specific gravity of Maine potatoes.

*Amer. Potato J.*, 1950, 27: 417-24, bibl. 4.

## TOBACCO.

### General.

(See also 1250, 1264, 1815e, 2004, 2006, 2148, 2150.)

1790. BORDELEAU, R.

The production, harvesting and curing of cigar tobacco.

*Publ. Canada Dep. Agric.* 832, 1950, pp. 30, illus., being *Fmrs' Bull.* 160.

A complete account of production introduced with a brief history of cigar tobacco in Canada. The industry is centred in Quebec province. The 4 most popular varieties are described with average yields and the time taken to mature. Correct choice of soil has an important bearing on the quality of tobacco; alluvial soils—very fertile silty loams bordering rivers, mainly the Yamaska River—are the most suitable. Crop rotation, though essential on other soils, can be dispensed with on these soils. Stress is laid on the correct degree of ripeness at harvest time. Plans of a type of barn suitable for curing cigar tobacco are among the numerous good illustrations.—Dominion exp. Stat., L'Assomption, Que.

1791. HASLAM, R. J., and SCOTT, W. A.

Production, harvesting and curing of burley tobacco.

*Publ. Canada Dep. Agric.* 840, 1950, pp. 32, illus., being *Fmrs' Bull.* 163.

This is a complete guide to burley tobacco growing in south-western Ontario, introduced by a brief history, and notes on uses, production and price trends. Climate constitutes one of the principal limiting factors. Normally, tobacco requires a period of 90 to 100 days from the date of transplanting to harvest, and while loss due to frost is seldom experienced, adverse weather conditions prevailing in any particular season can seriously reduce the quality of the crop. The lighter soils are the most dependable, but heavier soils, provided the drainage is adequate, are also suitable. Crop rotation is essential for controlling leaf diseases and is beneficial to yields. For practical purposes varieties are grouped into 3 distinct classes. The seedlings are raised in cold frames, cotton-covered beds, or glasshouses in steam-disinfected soils. Transplanting takes place at the end of May or early June, and cultivation is carried out regularly until the tobacco is topped. The majority of varieties respond well to early topping, i.e. about the time the first flower opens. Harvesting should be carried out when the weather is warm to ensure immediate wilting. The curing of

the leaves is described and plans and illustrations are provided of types of modern curing barns.—Dominion Exp. Stat., Harrow, Ontario.

1792. TOMLINSON, F. R.

The cost of production of flue-cured tobacco.

*Fmg S. Afr.*, 1950, 25: 334-8.

Production costs in 1948-49 are tabulated and discussed for 100 farms in the Brits and Rustenburg districts of the Western Transvaal irrigation area. A more comprehensive analysis of the data is to be published shortly.

### Morphology and growth.

(See also 1815d.)

1793. ARSAN, E.

Contribution to the study of the anatomy of Turkish dry leaf tobaccos III. [Turkish, English summary ½ p.]

*Tekel Enst. Raporlari*, 1949, 5: 203-15, bibl.

6, illus. [received Dec. 1950].

Transverse sections and the epidermal surface of leaves of three Turkish varieties of tobacco are described, with the aid of many drawings.

1794. POLJAKOV, I. M.

The changes in the physiological properties of the tissues of the pistil when pollinated with mixed pollen. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 71: 179-82, bibl. 8.

A study was made of the interactions of the pollen tubes in the styles in the "progamic" (pre-fertilization) stage of pollination, using mixed pollen, in tobacco and *Nicotiana rustica*.

1795. MIHAİLOVA, P. V.

The interaction of mixed pollens. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 71: 771-3, bibl. 9.

Experiments were carried out with *Nicotiana suaveolens*, *N. calycina*, *N. glauca* and *N. rustica*, using pollen in each case from two of the species mixed in different proportions, and the germination of the pollen grains was examined in a nutrient medium consisting of agar 1%+10% saccharose. In each series the pollen from *N. suaveolens* was one of the components, because it is readily recognized by the large size and triangular shape of the grains. It was found that the pollen of any one species creates a "physiological environment" for that of the other, and affects the rate of growth of the pollen tubes, sometimes retarding, sometimes stimulating their development.



**Cultivation and nutrition.**

(See also 2147, 2177, 2179.)

**1796. TOBACCO RESEARCH STATION, RUSTENBURG.****Premature flowering of tobacco.***Fmg S. Afr.*, 1951, 26: 16.

Early sowing tends to accentuate premature flowering in tobacco plants. Experiments have shown that tobacco seed sown later produces plants that can be harvested almost at the same time as tobacco from early-sown seed with less risk of premature flowering.

**1797. McEvoy, E. T.****The effect of chlorine on tobacco.***Lighter*, 1950, 20: 3: 14-15.

The experimental evidence, briefly reviewed here, indicates that chlorine may affect yield and quality of tobacco either favourably or unfavourably, depending on the amount present, the use for which the tobacco is intended, and other factors. On light sandy loam a moderate amount of chlorine in the fertilizer has been found to increase yield by 10%, 20-30 lb. per acre giving the maximum stimulation. Particularly in the case of flue-cured tobacco, 2% chlorine in the fertilizer increased the acre value of the crop. Excessive amounts of chlorine reduce yield and lower quality by producing a thick, brittle leaf which, when cured, has poor elasticity, a dull colour and inferior burning quality.

**Composition.****1798. BENNETT, H., AND COOMBER, H. E.****Tobacco from Mauritius.***Colon. Plant Anim. Prod.*, 1950, 1: 125-32.

Six samples of Mauritius tobacco (Virginian type) were examined in England and submitted to manufacturers for smoking tests. Analysis showed one sample to be satisfactorily low in nicotine and nitrogen percentages. These tobaccos were not, however, considered marketable in the United Kingdom. In the case of a burley tobacco grown on the Tobacco Experiment Station, one firm considered the flavour sufficiently good to recommend the despatch of a sample shipment.

C.W.S.H.

**1799. FEINSTEIN, L., AND McCABE, E. T.****New tests for the *Nicotiana* alkaloids, normicotine and anabasine.***Science*, 1950, 112: 534.

A preliminary account is given of two new colour tests, one for normicotine and anabasine and one for normicotine alone.

**Diseases.**

(See also 1683, 1712, 1815a, b, c, 2161.)

**1800. KOCH, L. W., AND BERKELEY, G. H.****Diseases of tobacco in Canada.***Publ. Canada Dep. Agric.* 667, 1950, pp. 38, illus., being *Fmrs' Bull.* 85.

After an introduction dealing with the sanitation, sterilization, manuring, ventilation and watering of the seed-bed, seed selection and treatment, 11 diseases and disorders of the seed-bed, and 17 in the field, are described, as are symptoms of K, N, P and Mg deficiencies.

**1801. BAWDEN, F. C., AND KASSANIS, B.****Some effects of host nutrition on the susceptibility of plants to infection by certain viruses.***Ann. appl. Biol.*, 1950, 37: 46-57, bibl. 10, illus.

Fertilizer treatment increasing the growth of tobacco and potatoes did not appreciably affect the number of plants becoming infected with potato virus Y. The number was only slightly decreased by N and increased by P. With tobacco virus, growth-increasing fertilizers increased the number of local lesions both absolutely and, in certain cases, per unit leaf area. C.W.S.H.

**1802. BAWDEN, F. C., AND KASSANIS, B.****Some effects of host-plant nutrition on the multiplication of viruses.***Ann. appl. Biol.*, 1950, 37: 215-28, bibl. 19.

The multiplication of tobacco mosaic virus in inoculated leaves and in systemically infected plants was studied at different planes of mineral nutrition. Phosphorus increased plant size, the virus concentration of the sap and the total virus per plant. Nitrogen had similar effects only when phosphorus was also supplied. Potassium slightly reduced the virus concentration of the sap. The virus production was at the expense of the plant proteins. The nutrition of the plant did not affect the intrinsic infectivity of the virus. The concentration of virus in the sap of potato plants systemically infected with potato virus Y was not affected by fertilizers. These results are discussed in relation to those obtained on tobacco mosaic by Spencer. C.W.S.H.

**1803. KÖHLER, E.****Über die Bildung nekrotischer Zonen an virusinfizierten Tabakblättern. Zugleich ein Beitrag zur Frage der Virusbewegung im Blattparenchym. (The formation of necrotic zones in virus-infected tobacco leaves. A consideration of the movement of virus in the leaf parenchyma.)***Phytopath. Z.*, 1950, 17: 115-27, bibl. 17, illus.

The formation of necrotic zones as primary and secondary symptoms of virus infection in tobacco leaves is discussed, and theoretical aspects are presented.

**1804. LASHBROOK, R. V., AND LORING, H. S.****Radioactive tobacco mosaic virus.***Abstr. in Fed. Proc. Amer. Soc. exp. Biol.*, 1950, 9: 1: 194, from abstr. in *Rev. appl. Mycol.*, 1951, 30: 2-3.

At Stanford University, California, several methods were studied for the incorporation of radio-active phosphorus ( $P^{32}$ ) into tobacco mosaic virus in Turkish tobacco plants. The most highly radio-active virus was obtained when normal plants were allowed to take up the  $P^{32}$  phosphate as completely as possible from small volumes of distilled water and were grown in nutrient medium for a fortnight or so after inoculation. When radio-active virus was inoculated into growing leaves, the recovered virus had the same radio-activity as the inoculum, but 24 hours later the amount recovered was only 10% to 20% of the original. In these cases over 50% of the radio-activity was found in the

supernatants after ultracentrifugation. The results of the several types of experiments performed indicate that (a) there is little or no exchange of  $P^{32}$  between virus and host; (b) virus becomes associated with insoluble plant components, such as chloroplasts, after inoculation; and (c) during virus multiplication the original virus phosphate is largely converted to a non-virus form.

1805. HIRAYAMA, S.

**Considerations on the transport of mosaic disease of tobacco.** [Japanese.]

*Proc. Jap. Soc. Advan. Sci.*, 1939, 14: 150-3, from abstr. in *Jap. J. Bot.*, 1940, 11: (9) [received 1950].

Attempts to transmit virus disease through the seeds of tobacco plants resulted in failure. The addition of powdered seeds or healthy seedlings of tobacco to sap of infected leaves reduced its power of infection. It is therefore concluded that seeds and healthy seedlings contain substances that render them immune from infection. It was further found that plants grown on infected soil will not become diseased unless the roots are badly damaged.

1806. RYŽKOV, V. L., TARASEVIČ, L. M., AND LOIDINA, G. I.

**The effect of strong solutions of sodium nucleinate on the virus of the mosaic disease of tobacco (VTM) and on albumen.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 74: 1023-4, bibl. 2.

Strong solutions of sodium nucleinate precipitates egg albumen and the virus nucleoprotein (VTM) from solution. As a result the albumen precipitate loses its solubility in water, while VTM retains its solubility and infectibility.

1807. STOVER, R. H.

**The black rootrot disease of tobacco. II. Physiologic specialization of *Thielaviopsis basicola* on *Nicotiana tabacum*.\***

*Canad. J. Res., Sect. C*, 1950, 28: 726-38, bibl. 10, being *Contr. Div. Bot. Plant Path., Sci. Serv., Dep. Agric. Ottawa* 1047.

*Thielaviopsis basicola* (Berk. & Br.) Ferraris exists in nature in two distinct forms, termed the brown and the grey wild type, which are differentiated on potato dextrose agar. Pathogenicity on tobacco was found to be a function of the wild type culture used. All grey wild type cultures were less pathogenic than the brown. [From author's abstract.]

1808. KELENY, G. P.

**The effect of black-root-rot on growth of seedlings of four varieties of tobacco.**

*J. Aust. Inst. agric. Sci.*, 1950, 16: 158-9, bibl. 7.

In greenhouse experiments at Canberra 4 varieties were grown under conditions highly favourable to the development of black-root-rot caused by *Thielaviopsis basicola*. The variety Hickory Pryor was the most

susceptible to the disease and produced the lowest yield. KY 41A was the most resistant, producing the highest yield, while Yellow Special and Harrison's Special were intermediate in both resistance and yield. There were no significant yield differences between the varieties when grown in disease-free soil.

### *Insect pests and nematodes.*

(See also 2147, 2172, 2173.)

1809. KINCAID, R. R., AND VOLK, G. M.

**Soil fumigation for cigar-wrapper tobacco fields.**

*Press. Bull. Fla agric. Exp. Stats* 655, 1948, pp. 4 [received 1950].

About three-quarters of the acreage of cigar-wrapper tobacco grown under shade in Florida was fumigated in 1948. Fumigants used were D-D or Dowfume N at 20 gal. per acre and Dowfume W-40 or Soilfume 60-40 at 15 gal., both injected about 6 in. deep at intervals of 12 in. Instructions are given on timing of the fumigation, preparation of the soil and compacting of the soil after the operation. Fumigation has given particularly good control of root-knot nematode, but has been less satisfactory against the nematode root rot disease known as "coarse root". It has markedly increased yields in most cases, but has produced a small but rather consistent reduction in burn. It has also led to nitrogen conservation in the soil by delaying the change from ammonia to nitrate N by several weeks.

1810. HANEY, T. G.

**Chemicals for the control of weeds and nematodes in tobacco seed-beds.**

*J. Aust. Inst. agric. Sci.*, 1950, 16: 109.

An alternative was sought to the layer of burnt material from the inner matrix of termite mounds which is commonly used in North Queensland for sterilizing tobacco seedbeds. "Cyanamid" (Calcium cyanamide)-urea mixtures controlled both weeds and nematodes. DD controlled nematodes but stimulated weed growth. C.W.S.H.

1811. ROSILLO, M. A.

**Experiencias contra *Faustinus cubae* (Boh.). (Experiments in the control of *Faustinus cubae*.)**

*Idia*, 1950, 3: 32: 13-14, illus.

In trials carried out at the Salta Experimental Station, Argentina, good control of the tobacco pest *Faustinus cubae* was obtained by applications of cryolite, gamexane or DDT in solution to the soil round the plants in the seedbed. Tobacco type Criollo Salteño was used, and no damage to the plants was observed. As a result of these trials, it is recommended that growers should apply 50% wettable DDT at the rate of 1,000 g. in 400 l. water, per 130 sq. m. of seedbed.

1812. ASHBY, D. G.

**The phytotoxic effects of D.D.T., B.H.C., parathion and toxaphene on tobacco.**

*Ann. appl. Biol.*, 1950, 37: 624-39, bibl. 8, illus.

As tobacco is liable to be attacked by insects in its early stages, and as insecticides are commonly used in the seedbeds, it was considered important to know

\* For Part I, see *Ibid.*, 1950, 28: 445-70.



the effect on the plant itself of the newer insecticides. Pre-sowing applications of DDT at 27 lb. per acre, parathion at 1.8 lb. per acre, or toxaphene at 6.4 lb. per acre caused serious stunting. There were no residual effects from these insecticides in beds sown 4 months after treatment. BHC at 1.6 lb. per acre suppressed root development when applied before sowing; applied to 11-day seedlings it caused distortion and stunting, which was transitory with applications up to 11 lb. per acre. At 37.5 lb. per acre, however, many plants died, and this also happened with 3-week-old plants receiving BHC at 75.6 lb. per acre. The action of BHC on the plant is not understood, but there seems to be a connexion between rate of growth and susceptibility.—Tobacco Pest Control Res. Scheme, Salisbury, S. Rhodesia. C.W.S.H.

1813. AKSU, S.

Tütün yapraklarında kalan DDT nin tayini hakkında. (The DDT content of tobacco leaves treated against *Thrips tabaci*.) [Turkish, French summary  $\frac{1}{2}$  p.] *Tekel Enst. Raporlari*, 1949, 5: 294-6.

A method of determination adapted particularly for use on tobacco is described.

### Harvesting and processing.

(See also 1790, 1791.)

1814. RICHARD, J.

Harvesting and curing of flue-cured tobacco.

*Lighter*, 1950, 20: 3: 10-13.

Detailed directions are given to growers on topping, suckering, harvesting, curing and storage of flue-cured tobacco, the effect of these operations on final quality being indicated.

## MISCELLANEOUS TEMPERATE AND TROPICAL CROPS.

### General.

1816. SACCO, P.

Piante, erbe e fiori: medicine, liquori e profumi. (Plants, herbs and flowers for drugs, liquors and perfumes.)

*Ital. Agric.*, 1951, 88: 102-7, illus.

An account is given of pharmaceutical plants to encourage their cultivation in Italy. Illustrations are given of absinthe, opium poppy, henbane, foxglove, deadly nightshade, valerian, and thorn apple, lavender, milfoil, thyme, aniseed, lady's mantle, and colchicum.

### Drug plants.

(See also 1248, 1870b, f, j, 2150.)

1817. BENNETT, H., AND COOMBER, B. E.

Aloes from the Leeward Islands.

*Colon. Plant Anim. Prod.*, 1950, 1: 137-8.

A sample of aloes prepared in Anguilla was found to be very satisfactory from the commercial standpoint and to conform to the requirements of the British Pharmacopoeia except for a slightly high moisture content. The aloin content was equivalent to that of fair quality Curaçao aloes. C.W.S.H.

### Noted.

1815.

a GORODSKAJA, O. S.

A new method of purifying the tobacco mosaic virus. [Russian.]

*Biohimija* (Biochemistry), 1950, 15: 507-8, bibl. 4.

An acridine (rivanol) method.

b

MATSUMOTO, T.

Serological studies on the distribution and concentration of tobacco mosaic virus in host plants. I-VI. [Japanese summary.]

*Trans. nat. His. Soc. Formosa*, 1941, 31: 201-15, 275-85, 306-13, 345-50, 445-50, and 1942, 32: 159-67, illus., from abstrs in *Jap. J. Bot.*, 1941, 11: (143)-(144); 1942, 12: (14); and 1943, 12: (48) [received 1950].

c

VAN DER MERWE, G.

Tobacco mosaic and its control.

*Fmg. S. Afr.*, 1950, 25: 370-2, bibl. 6, illus. Sanitary measures are recommended.

d

NOGUTI, Y., OKA, H., AND ÔTUKA, T.

Studies on the polyploidy in *Nicotiana* induced by the treatment with colchicine II. Growth rate and chemical analysis of diploid and its autotetraploid in *Nicotiana rustica* and *Nicotiana tabacum*.

*Jap. J. Bot.*, 1939, 10: 343-64, illus., from note in *Jap. J. Bot.*, 1940, 11: (25) [received 1950].

e

SACAY, F. M., TAGORDA, Q. T., AND FERNANDEZ, G. B.

An economic and social study of tobacco farming in Isabela.

*Philipp. Agric.*, 1949, 33: 88-96, bibl. 2.

1818. SCHÖNBERG, A., AND SINA, A.

Experiments with xanthotoxin and imperatorin obtained from the fruits of *Ammi majus* (L.).

*J. Amer. chem. Soc.*, 1950, 72: 4826-8, bibl. 13.

*Ammi majus* is an old Arab drug plant. The investigation on the two compounds was carried out at the Faculty of Science, Cairo, Egypt.

1819. CHAKRAVARTI, K. K.

Alkaloidal constituents of the bark of *Berberis aristata* (Rassaut).

*J. sci. industr. Res. India*, 1950, 9B: 306, bibl. 1.

Three alkaloidal chlorides extracted from the bark of *Berberis aristata* have been identified as berberine chloride, palmatine chloride and a mixture of the two.

1820. SUGAWARA, T.

Effect of chemical growth substance on the bending of flower stalks in *Papaver*.

*Proc. imp. Acad.*, 1942, 18: 89-96, illus., from abstr. in *Jap. J. Bot.*, 1943, 12: (62)-(63) [received 1950].

The application of various growth substances in lanolin

paste to one side of the peduncle of *Papaver somniferum* resulted in either a positive or negative curvature, according to the concentration. Microscopic examination showed that the curvature was due to the enlargement of parenchyma cells and intercellular spaces on the treated side, and to the formation of meristematic tissues.

1821. MEFFERT, M.-E.

Ein Beitrag zur Biologie und Morphologie der Erreger der parasitären Blattdürre des Mohns. (The biology and morphology of the fungus causing leaf scorch of poppy.) Reprinted from *Z. Parasitenk.*, 1950, 14: 442-98, bibl. 45, illus.

A study of the biology, morphology, and culture of *Helminthosporium papaveris* (*Pleospora papaveracea*) in relation to its infection of the opium poppy (*Papaver somniferum*).

1822. MATSUMOTO, T., AND HIRANE, S.

On the causal organism of a bacterial soft rot of poppy in Formosa. [Japanese, English summary.]

*Trans. nat. His. Soc. Formosa*, 1941, 31: 1-13, illus., from abstr. in *Jap. J. Bot.*, 1941, 11: (144) [received 1950].

The bacillus isolated from opium poppies infected with bacterial soft rot, in general characters, identical with *Bacillus aroidae* isolated from radish. The serological and bacteriophage characters of the two organisms, however, differed widely, so the identity of the poppy bacillus is still uncertain.

1823. CABRERA, A. L.

El nombre correcto de la lucera. (The correct name for "lucera" [*Pulchea sagittalis*].)

Reprinted from *Bol. Soc. argent. Bot.* 3: 1: 35-6, as *Publ. téc. Inst. Bot. B. Aires* 33 (n.s.), 1949, pp. 2, bibl. 10.

A species of *Pluchea* that is used in popular medicine in the Argentine is generally known as *P. quitoc* DC. The author gives his reasons for considering that it should be called *P. sagittalis*.

1824. FRIED, J., WHITE, H. L., AND WINTERSTEINER, O.

The hypotensive principles of *Veratrum viride*.

*J. Amer. chem. Soc.*, 1950, 72: 4621-30, bibl. 19.

The roots and rhizomes of *Veratrum viride* are shown to contain two hitherto undescribed crystalline alkaloids, germinidine and germitrine, which are powerful hypotensive agents.—Squibb Inst. for Medical Research, New Brunswick, N.J.

*Essential oils.*

(See also 1870c, g, h.)

1825. RIBEIRO, D. J.

Camphor production from *Ocimum kili-mandscharicum* Guerke.

*J. sci. industr. Res. India*, 1950, 9B: 281-2.

Using a simple portable 40 gal. still designed for the purpose, tests have been made in Bombay State on the

extraction of camphor from leaves of *Ocimum kili-mandscharicum*. Withered leaves exposed for 4 months to adverse weather conditions yield an average of 2.64% total distillate (1.56% camphor) compared with 4% of dry weight in fresh leaves dried for a week in the shade. Storing the leaves did not appear to affect yields of camphor adversely. Yields of distillate and the ratio of camphor to oil in the leaves were found to vary with locality and from season to season within a locality.

1826. BARBER, L. A., AND HALL, M. D.

Citronella oil.

*Econ. Bot.*, 1950, 4: 322-36, bibl. 21, illus.

Citronella oil is distilled from a number of varieties of citronella grass, *Cymbopogon nardus*, and is used to mask unpleasant pharmaceutical and industrial odours. The old sources of supply were concentrated in Ceylon, Java and Indonesia, but these are now being overtaken by expanding industries in the Central American Republics. Varieties, cultivation, distillation and trade with the U.S.A. are discussed.

1827. BROWN, E., AND OTHERS.

Essential oils from Tanganyika. Geranium oil.

*Colon. Plant Anim. Prod.*, 1950, 1: 109-13.

Samples of geranium oil from *Pelargonium* species were found to be of good quality, particularly a pale yellow-green oil from *Pelargonium capitatum*, which had a high ester value of 84.3, equivalent to 35.5% expressed as geranyl tiglate. The yield of oil, 0.03%, was low compared with Algerian oil. As far as quality is concerned, however, this oil would be readily marketable in the United Kingdom in place of Algerian or Bourbon oil.

1828. BROWN, E., AND ISLIP, H. T.

Essential oils from Tanganyika. Oil of *Helichrysum kilimanjari*.

*Colon. Plant Anim. Prod.*, 1950, 1: 117-18.

The reddish-brown oil from this native plant was compared with oil of *H. angustifolium*, used in France, and *H. stoechas*, also occasionally produced commercially. It was concluded that *H. kilimanjari* oil could be used in perfumery. C.W.S.H.

1829. MATHON, C. C.

Appunti sulla vegetazione e in particolare sui lavandeti di Ponte di Nava. (Notes on the vegetation and particularly on the lavender fields of Ponte di Nava.)

*Riv. Ecol.*, 1950, 1: 120-43, bibl. 22, illus.

A study of the flora of the lavender fields (*Lavandula vera*) on the dolomite formation of Ponte di Nava in the valley of the R. Tamaro in N. Italy.

1830. BROWN, E., COOMES, T. J., AND ISLIP, H. T.

Essential oils from Tanganyika. Rosemary oil.

*Colon. Plant Anim. Prod.*, 1950, 1: 114-16.

A sample of rosemary oil conformed to the requirements of the British Pharmacopoeia, 1948, except in weight per millilitre, which was slightly below the specified amount. The odour differed from commercial oil of Spanish origin possibly due to contamination. C.W.S.H.



1831. SIERRA, H. M.

La producción de aceites esenciales en el país. (The production of essential oils in Guatemala.)

Rev. agric. Guatemala, 1950, 1 (series 3a): 43-6.

Guatemala is the second highest producer of essential oils in the world. Statistical data are presented on the quantities and values of citronella and lemon grass oils produced in that country in recent years. Apart from these, small quantities of eucalyptus oil are produced. The economic situation of the industry is discussed, and brief notes are given on the cultivation of the crops.

1832. NAKAMURA, M., AND SUZUKI, M.

Microchemical observation of some perfume yielding plants. [Japanese, English summary.]

Hort. trop., 1941, 10: 119-42, illus., from abstr. in Jap. J. Bot., 1942, 12: (17) [received 1950].

A microchemical study of a number of essential oil producing plants showed that oil was produced in oil cells, oil sacs, intercellular spaces, bladder hairs and papillae. The distribution of oil-yielding tissues in the various organs of a number of genera is indicated.

*Fibres.*

(See also 1870a, i.)

1833. HIBON, E.

Sur un pandanus cultivé en Océanie française: *Pandanus tectorius* var. *laevis*. (A pandanus grown in French Oceania.)

Rev. Agric. Réunion, 1950, 50: 96-100.

A popular account of the culture and uses of *Pandanus tectorius* var. *laevis* in Tahiti, the Austral Islands and Marquesas Islands. The dried leaves are woven into hats, mats, etc., by the natives.

1834. PAREDES C., A.

Una especie textil ecuatoriana. (A fibre plant from Ecuador.)

Bol. Inst. Bot. Univ. Centr. Quito, 1949, 8: 8: 3-14, illus., from abstr. in Rev. Fac. Agron. La Plata, 1949, 27: 125 [received 1951].

*Phoenix rugosa* (Urticaceae) is a plant indigenous to Ecuador, growing at altitudes between 2,700 and 3,000 m. It produces high quality fibre similar to that of ramie. In this paper are presented morphological and histological data, and notes on geographical distribution and the technology of the crop, including a description of the fibre and the methods of separation.

1835. CHITTENDEN, A. E., AND COOMBER, H. E.

Tingo fibre from Nyasaland.

Colon. Plant Anim. Prod., 1950, 1: 138-40.

Tingo fibre is prepared from *Pouzolzia hypoleuca*. Examination of the ultimate fibres showed that they were only one-tenth of the length of ramie fibres and of smaller diameter. Moreover, the cell walls were irregular, having projections and nodes. The fibre requires to be degummed and, though this could be done, the prepared fibre is so weak that it is unlikely to be commercially acceptable, except at a very low price. C.W.S.H.

1836. WALLY-VAN VREESWIJK, A. C.

Cultivation and spinning of ramie.

Chron. Nat., 1950, 106: O.S.R. News, 1950, 2: 96-8.

Many attempts have been made during the last few decades to develop the culture of ramie (*Boehmeria nivea*) in Indonesia, but these have all failed as a result of difficulties encountered in cultivation, extraction of the fibres, degumming and spinning. The Japanese, during their occupation of the islands, successfully extended the industry, thus proving that these difficulties could be overcome. The present article is a report on the methods of culture and manufacture practised in Japan, which provide a solution to most of the Indonesian problems.

*Gums and resins.*

1837. HOWES, F. N.

Age-old resins of the Mediterranean region and their uses.

Econ. Bot., 1950, 4: 307-16, bibl. 19.

The source, areas of production and uses, past and present, of 11 resins are given.

1838. BREGMAN, A.

De benzoe-situatie in Tapanuli voor de tweede wereldoorlog. (The benzoin situation in Tapanuli before the second world war.)

[English summary 2 pp.]

Landbouw, 1950, 22: 39-68, bibl. 3, illus.

The district of Tapanuli in Sumatra has practically a monopoly in the production of benzoin, which has become an export product of great importance locally. The resin is exported to the Far East for burning incense, to Java for the manufacture of cigarettes and to Europe for use in pharmacy. Formerly a forest product, benzoin is now obtained from plantation trees, *Styrax paralleloneurus* and *S. benzoin*, which are exploited regularly. There has been a serious drop in prices since 1929, which is thought to be largely due to the increasing adulteration of the resin with dammar. Although the incorporation of dammar serves a useful purpose in the process of burning incense, it is recommended that the percentage contained in benzoin intended for export should be specified, and the purity of the product exported to Java and Europe should be raised. Standards for quality should be established and the present systems of cultivation and marketing thoroughly investigated. It is suggested that more intensive cultivation would benefit the producer, although expansion of the acreage is not recommended.

1839. GUSEVA, A. R.

The chemical composition of the cortex of the roots of *Euonymus verrucosa*. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1950, 71: 1077-80, bibl. 10.

The data from chemical analyses are tabulated for resins, water-soluble carbohydrates and organic acids, with reference to the possibility of using *Euonymus verrucosa* as a source of resin.

*Herbs and condiments.*

1840. ISLIP, H. T., AND MATTHEWS, W. S. A.

Cinnamon bark from Seychelles.

Colon. Plant Anim. Prod., 1950, 1: 119-22.

Samples of bark from trees 5 years old, 18 months old and 9 months old did not differ significantly from each other in the physical and chemical properties of their oil, though the cinnamic aldehyde content of the 5-year-old bark oil was the highest. All oil samples differed from Ceylon oil and failed to fulfil the requirements of the British Pharmacopoeia in many respects. This may be due to soil and climate or to varietal differences.  
C.W.S.H.

1841. COOMBER, H. E., AND COOMES, T. J.

**Ginger from Sierra Leone.**

*Colon. Plant Anim. Prod.*, 1950, 1: 140-3.

Imported Jamaican, Canton and Dominican varieties were grown at Njala and rhizome samples were sent to England together with a sample of a local variety. Analyses showed the samples to be well up to the British Pharmacopoeia requirements. The appearance was poor owing to insufficient scraping. Commercial interests considered the imported varieties to be superior to commercial West African ginger, but inferior to the same varieties from their countries of origin. The local variety had not been grown and harvested under the same conditions and was inferior to commercial West African ginger.  
C.W.S.H.

1842. MAHMUD, K. A.

**Propagation of Bangla variety of pan (*Piper betle*) in the Central Provinces.**

*Proc. Indian Acad. Sci., Sect. B*, 1950, 31: 120-4, bibl. 1.

Two-year-old vines of the Bangla variety of pan were cut into 12 pieces or cuttings, each consisting of 5 internodes and measuring 12 to 15 inches in length. The first to fourth cuttings nearest the apex had 3 leaves each, the fifth and sixth 2 leaves and the seventh to twelfth no leaves. The cuttings were planted on 1 September, 1943, each treatment being replicated 4 times. Over 91% of the cuttings started growth in each case, though the first 4 cuttings took longer to grow than the rest and the first 3 showed slightly lower "germination". High mortality due to poor root development occurred in the seventh to twelfth cuttings, and these older cuttings also showed higher mortality through infection by *Phytophthora parasitica* var. *piperina*. The first cutting showed the highest rate of growth and produced the largest yield of pan leaves. The first 3 cuttings are recommended for "seed" purposes.

1843. VELÁZQUEZ C., A.

**Cultivo y aprovechamiento de la sarrapia. (The culture and exploitation of the tonka bean.)**

*Agric. venezol.*, 1950, 15: 145: 18-21, bibl. 6, illus.

The tonka bean (*Coumarouna* [*Dipteryx*] spp.), the seeds of which contain coumarin, is a tree indigenous to South America, and is found in large numbers along the banks of rivers in Venezuela. It appears to require a well drained soil, rich in humus. Two types are recognized in Venezuela, *C. odorata* and its sub-species *C. punctata*, both rich in coumarin, and *C. oppositifolia*, producing seeds of a poorer quality. The coumarin is mainly used for flavouring tobacco, but is also utilized in the perfumery, cosmetic, liqueur and confectionery industries and for medicinal purposes. Although the

tree does so well in Venezuela in the wild state, little attempt has been made to cultivate it systematically. Methods of culture, described here, and extraction are simple, and the tree is remarkably free from pests and diseases; it is therefore considered that development of an industry would not involve much capital expenditure and would be of great economic value to the country.

1844. COOMBER, H. E., COOMES, T. J., AND ISLIP, H. T.

**Tonka beans from Nigeria.**

*Colon. Plant Anim. Prod.*, 1950, 1: 134-6.

Samples of tonka beans were treated by soaking in 65% alcohol for 4 days or 7 days, or soaking in previously used alcohol for 3 days. All samples were found to have a much lower moisture content (3.0-3.9%) than Brazilian "crystallized para" and the coumarin percentage was lower. The appearance was unattractive and there was a lack of crystallized coumarin on the surface of the beans. It was recommended that, to improve quality, the beans should be air-dried to 15-20% moisture, sorted, soaked in 65% alcohol for 24 hrs, dried in the shade and packed tight in barrels or tins.  
C.W.S.H.

**Hops.**

(See also 1716, 2178.)

1845. HAMAGUTI, N.

**Preliminary studies as a basis for hop investigations.** [Japanese.]

*Biol. Arb. Dainippon Bierbr.*, 1942, 1: 29-42, illus., from abstr. in *Jap. J. Bot.*, 1943, 12: (38) [received 1950].

In experiments designed to determine the sex of hop plants at an early stage of development it was observed that the female homozygous plants were more sensitive to treatment with potassium chlorate than were the male heterozygotes. On female plants the flowers opened first at the sixteenth and seventeenth nodes, and opening proceeded both acropetally and basipetally until the third day; thereafter they opened mainly in acropetal succession. On the small laterals, flowers opened in basipetal succession only. Most of the male flowers opened between 6 and 8 a.m. Treatment of the buds of seedling hops with 10.0-0.5%  $\beta$ -indoleacetic acid resulted in prolific root formation when the plants were grown on in water culture.

1846. DŽAPARIDZE, L. I.

**Transpiration in dioecious plants.** [Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1949, 67: 1143-6, bibl. 9.

In testing the transpiration rate of a number of woody and herbaceous plants (including hop) it is concluded that the transpiration process in the ♀ plants is more intense than in the ♂ plants.

1847. WILLCOX, O. W.

**Solving a problem of yield vs. density of stand of hop vines.**

*Agron. J.*, 1950, 42: 410-12, bibl. 6.

From a re-examination of data given by Keller and Li [see *H.A.*, 20: 948] showing the yield of hops obtained from varying numbers of vines per hill, it is concluded that yield as a function of density of stand conformed



to the Mitscherlich law of yield. A standard yield curve was drawn and this illustrated the law of diminishing increments of yield. The method used by Keller and Li of fitting a parabola to their data and using analysis of variance and a regression equation on yield is criticized. It is suggested that if the law of diminishing increments, which puts a definite limit on the power of any growth factor to increase growth or yield, is ignored, the mathematical investigations of the effect of growth factors will not be of any practical value. C.W.S.H.

1848. KELLER, K. R., BULLIS, D. E., AND MAGEE, R. A.

The use of soft resin content for evaluating hops, *Humulus lupulus* L.

*Agron. J.*, 1950, 42: 492-4, bibl. 10, being *Tech. Pap. Ore. agric. Exp. Stat.* 601.

An analysis was made of the resins in the lupulin from 73 strains of hop: The total soft resin content and the alpha acid and beta fraction were determined. There were highly significant differences between varieties for all these determinations and for the ratio of alpha acid to total soft resin content. The soft resin content has been used for assessing the preservative value or brewing value of the hop resins, and in this respect the alpha acid is the most important constituent of the soft resin. The determination of the ratio of alpha acid to total soft resin provides a basis for the evaluation of hops for purchase as well as for breeding.

C.W.S.H.

### Insecticidal plants.

(See also 1870d, e.)

1849. HEAL, R. E., AND OTHERS.

A survey of plants for insecticidal activity. *Lloydia*, 1950, 13: 89-162, bibl. 12.

After a short introduction there are notes on the botanical aspects of survey tests, insecticidal survey aspects of the tests, primary and secondary survey tests, and results of the survey, followed by tables of the plants examined (over 3,000 in all), and their toxic ratings.

1850. GERSDORFF, W. A., AND MITLIN, N.

Insecticidal action of American species of *Heliopsis*.

*J. econ. Ent.*, 1950, 43: 554-5, bibl. 3.

Tests showed that three species of *Heliopsis* contain material toxic to house flies, the main concentrations of toxin being in the roots.

### Rubber plants.

1851. MIHLIN, D. M., AND PŠENOVA, K. V.

Oxidizing enzymes and the accumulation of caoutchouc in the roots of kok-saghyz. [Russian.]

*Biohimija* (Biochemistry), 1951, 16: 5-11, bibl. 12.

Catalase and peroxidase may, according to circumstances, assist or check the synthesis of caoutchouc in rubber-producing plants. Polyphenoloxidase is considered in relation to its action on polyphenols, which

appear to be inhibitors of the polymerizing process. The products of oxidation, quinones, under biological conditions either remain inactive or assist the synthesis of caoutchouc, even aiding its polymerization.

1852. ORBEA, J. R.

Caracteres anatomicos en raices de "*Taraxacum kok-saghyz*" y su relación con el rendimiento en caucho. (Anatomical characters of *Taraxacum kok-saghyz* roots and their relation to yield of rubber.) [English summary  $\frac{1}{2}$  p.]

*Rev. Fac. Agron. La Plata*, 1949, 27: 53-78, bibl. 10, illus. [received 1951].

A brief anatomical description is given of *Taraxacum kok-saghyz* with particular reference to the root and laticiferous system. Staining and sectioning technique is discussed. The area of the section, the laticiferous area and the percentage of rubber were found to increase with the age of the plants. The most important factors influencing the rubber content of plants of the same age were the diameter of the laticiferous vessels and the number of these in a phloem bundle. The possibility of using a method based on a determination of the laticiferous area of the roots for the selection of high yielding strains of kok-saghyz is suggested.—Laboratorio de Citología del Instituto Fitotécnico, Santa Catalina.

1853. RE, R. R.

Extracción de caucho de "*Taraxacum kok-saghyz*". (Extraction of rubber from *Taraxacum kok-saghyz*.) [English summary  $\frac{1}{2}$  p.]

*Rev. Fac. Agron. La Plata*, 1949, 27: 79-96, bibl. 8 [received 1951].

The following methods of latex extraction were examined at the Instituto Fitotécnico, Santa Catalina, in an attempt to develop a method suitable for use in the Argentine: extraction by (a) diffusion, (b) alkali, (c) micro-organisms, (d) mechanical action and (e) solvents. With the diffusion method scarcely 50% of the rubber can be extracted and only fresh roots can be used. Extraction with alkali seriously affects quality of the product. Extraction by fermentation is recommended as requiring neither special equipment nor high temperatures. A good quality product is obtained, practically 100% of the rubber is extracted, and the whole process takes only 6 days. The remaining 2 methods were not tested experimentally at Santa Catalina.

### Tannins.

(See also 2150.)

1854. BENNETT, H.

*Alchornea cordifolia* leaves and bark from Nigeria.

*Colon. Plant Anim. Prod.*, 1950, 1: 132-4.

The leaves are used by Nigerian fishermen for dyeing and preserving their fishing nets. Analyses indicate that this effect is due to the tannin content of the leaves. These contain 10% tannin, while the bark contains 11%. This is insufficient to be of commercial interest in tanning. C.W.S.H.

**Vegetable oils.**

(See also 1583, 2150.)

1855. COOMBER, H. E., AND COOMES, T. J.  
**Marama (*Bauhinia esculenta*) oil from**  
**Bechuanaland.**

*Colon. Plant Anim. Prod.*, 1950, 1: 122-5.

Determinations were made of the physical and chemical properties of the oil obtained from the bean kernels of *B. esculenta* by hot pressing and extraction with light petroleum ether. The cosmetic properties of the oil were similar to those of almond and apricot kernel oils, but as mineral oils now constitute about 95% of the oils used in cosmetic manufacture it is not thought that there would be much demand for this oil for cosmetics. Its use for soap making would depend on the possibilities of large-scale production. C.W.S.H.

1856. ARGIKAR, G. P.  
**Breeding of safflower in the Bombay State.**  
*Poona agric. Coll. Mag.*, 1950, 41: 192-4,  
bibl. 3.

About 500,000 acres in Bombay State are devoted to safflower, *Carthamus tinctorius*. Improved strains are being developed, one of which, No. 630, has an oil content of 31% and yields about 10% more than the local variety. Desirable characteristics to be looked for in breeding and selection are indicated.

1857. CLAASSEN, C. E.  
**Natural and controlled crossing in safflower,**  
***Carthamus tinctorius* L.**  
*Agron. J.*, 1950, 42: 381-4, bibl. 4, illus.,  
being *Pap. J. Ser. Neb. agric. Exp. Stat.*  
487.

Before starting a breeding programme it was necessary to ascertain the amount of natural crossing to be expected in the safflower crop. The methods used consisted of making observations of the progeny of varieties with dominant and recessive flower colours. Natural crossing varied from 0 to 100%, though some inbred lines were only out-crossed to the extent of 5%. Natural cross-pollination was carried out almost entirely by insects. Controlled crosses were made by removing anthers in the bud 12-24 hours before anther dehiscence, rinsing the florets in 57% ethyl alcohol and pollinating the following morning.

C.W.S.H.

1858. CLAASSEN, C. E., EKDAHL, W. G., AND  
SEVERSON, G. M.  
**The estimation of oil percentage in safflower**  
**seed and the association of oil percentage**  
**with hull and nitrogen percentages, seed size,**  
**and degree of spininess of the plant.**  
*Agron. J.*, 1950, 42: 478-82, bibl. 3, illus.,  
being *Pap. J. Ser. Neb. agric. Exp. Stat.*  
493.

The breeding of new varieties of safflower with high yields and high oil contents has increased interest in this crop in some parts of the U.S.A. A strong negative correlation was found between the hull percentage of the seed and the oil percentage. Significant positive correlations were found between oil percentage and seed size, and degree of spininess of the plants, and a negative correlation between oil percentage and nitrogen content of the seed. Two

satisfactory methods were evolved for estimating the oil percentage without recourse to chemical analysis. One method consisted merely of the visual examination of cut seeds while the other method entailed crushing the seed and comparing the crushed material with standards of known oil content. C.W.S.H.

1859. MALAGUTI, G.  
**Phytophthora blight of safflower.**  
*Phytopathology*, 1950, 40: 1154-6, bibl. 4.

A *Phytophthora* species is reported in irrigated plots of safflower (*Carthamus tinctorius*) in Venezuela, causing a dark brown discoloration and finally death of the plants.

1860. DIRSH, V. M.  
**Two new African injurious grasshoppers.**  
*Bull. ent. Res.*, 1950, 41: 317-20, illus.

*Sesamum orientale* (leaves and young fruits) is among the economic plants severely injured by *Catantops joycei* n.sp., one of the two new grasshopper species described.

1861. MUNTAÑOLA, M.  
**Descripción de una nueva enfermedad del**  
**girasol. (A new disease of sunflowers.)**  
*Rev. Invest. agric. B. Aires*, 1948, 2: 205-11,  
bibl. 2, illus. [received 1951].

A disease of sunflowers, that caused serious damage to the oil crops in Argentina in 1942, is described for the first time. The first symptom is a mosaic of the leaves, which later develop necrotic spots. Black streaks and patches develop on the stems, and the plants die before the seeds mature. The results of inoculations indicate that the disease is probably of a virus origin.—Phytopath. Lab., Villa Alberdi, Tucumán.

1862. MUMA, M. H., AND OTHERS.  
**Control tests on sunflower insects in Nebraska.**  
*J. econ. Ent.*, 1950, 43: 477-80, bibl. 5.

Results of tests conducted in 1948 and 1949 showed that BHC was partially effective in the control of several species of sunflower insects, while DDT was found unsatisfactory.

1863. SHRIVASTAVA, R. C., KRISHNAMURTHY,  
R. S., AND ATHAWALE, C. R.  
**Oil from the seed of gokhru (*Xanthium***  
***strumarium*).**  
*J. sci. industr. Res. India*, 1950, 9B: 282,  
bibl. 5.

Extraction of the seed of *Xanthium strumarium* was facilitated by soaking the fruit for 12 hours in 2.5% sulphuric acid followed by sun-drying for 1-2 days. The seed contained 32% of a semi-drying oil, the chemical and physical constants of which are tabulated.

**Other crops.**

(See also 1870k.)

1864. BASHFORD, L. A., THOMAS, R. S., AND  
WOODWARD, F. N.  
**Manufacture of algal chemicals. I. Pro-**  
**duction of alginates from brown marine**  
**algae.**  
*J. Soc. chem. Ind. Lond.*, 1950, 69: 337-43,  
bibl. 7.



A process for the production of calcium alginate from *Laminaria digitata* and *Ascophyllum nodosum* is described.—Inst. of Seaweed Research, Inveresk Gate, Musselburgh, Midlothian.

1865. H[ARRISON], C. J., AND OTHERS.

Notes on bamboos.

*Serial Tocklai* 82, 1950, pp. 7, bibl. 4.

Eight species (*Bambusa tulda*, *B. balcooa*, *B. nutans*, *Melocanna bambusoides*, *Dendrocalamus hamiltonii*, *D. strictus*, *Pseudostachyum polymorphum* and *Arundinaria maling*) are described briefly, with notes on their propagation, maintenance of plantations, cutting, and pests and diseases. They are extensively used on tea gardens.

1866. YOSIOKA, K.

Ecological studies of "Nemagaritake" (dwarf bamboo).

*Ecol. Rev.*, 1939, 5: 117-30, 185-202, 304-12, illus., from abstr. in *Jap. J. Bot.*, 1940, 11: (45)-(46) [received 1950].

"Nemagaritake" (*Sasa kurilensis* and *S. paniculata*) grows in the mountainous regions of north Japan, either in the undergrowth of forests or forming pure associations. Its productivity is greatest at an altitude of 1,100-1,300 m., its density increasing with altitude but individual growth being best at the lower levels. On deep soils it grows in a pH range of 3.0-6.2, but is not found on peat moor. Propagation is almost exclusively vegetative. Plants live for 10-12 years on open land but only 5-9 years in shady conditions.

1867. PRESTON, R. D., AND SINGH, K.

The fine structure of bamboo fibres. I. Optical properties and X-ray data.

*J. exp. Bot.*, 1950, 1: 214-26, bibl. 19, illus.

The increasing attention being given in India to bamboo as a source of cellulose has made a knowledge of its fine structure desirable. X-ray analysis, together with refractive indices in longitudinal view and phase differences in transverse sections, have revealed the cellulose chain orientation. The layers of spirals and their angles to the cell length are described in detail.

C.W.S.H.

1868. HARADA, M.

Investigation on the development and the property of the wax and fat-like substances in the fruit of the *Rhus* plants found in Japan. [Japanese, English summary.]

*Bul. sci. Fak. Terkult. Kyûsû imp. Univ.*, 1939, 8: 326-42, illus., from abstr. in *Jap. J. Bot.*, 1940, 11: (6) [received 1950].

Wax cells were found in the mesocarp of fruits of *Rhus succedanea*, *R. silvestris*, *R. vernicifera*, *R. trichocarpa* and *R. toxicodendron* var. *vulgaris*, while in *R. semialata* var. *osbeckii* a wax crust developed on the epicarp. Observations are made on the development of the wax. In *R. semialata* the development of the wax crust is greater on the sunny side of the fruit than on the shaded side. [In Japan, wax from the fruits of *R. succedanea* is used for the manufacture of candles.]

1869. HARADA, M.

Quantitative investigations on the tissues of fruits of Japanese *Rhus* plants, with special reference to their wax content. [Japanese, English summary.]

*Bul. sci. Fak. Terkult. Kyûsû imp. Univ.*, 1941, 9: 327-36, from abstr. in *Jap. J. Bot.*, 1941, 11: (133)-(134) [received 1950].

The quantity of wax contained in *Rhus* fruits is proportional to the size of the mesocarp, which in turn is closely related to the size of the fruit and seed. In dried ripe fruit it may be better estimated by comparing the volume and weight of the mesocarp with those of the fruit. The results of quantitative estimations of wax content of various species and strains of Japanese *Rhus* plants are tabulated. Certain strains of *R. succedanea* were among the highest producers of wax.

Noted.

- 1870.

a AMERICAN RAMIE COMPANY.

Lo que es el ramio, un producto nuevo que podría ser fuente de riqueza en nuestra patria. (Ramie, a potential source of wealth for Costa Rica.)

*Rev. Agric. Costa Rica*, 1950, 22: 285-8.

b CHATTERJEE, R., AND GUHA, M. P.

Structure of neprotine: a new alkaloid of *Mahonia* species.

*Sci. and Cult.*, 1950, 16: 119-20, bibl. 5.

c EASTMAN, R. H.

The isolation of menthofuran from American peppermint oil.

*J. Amer. chem. Soc.*, 1950, 72: 5313-14, bibl. 6.

d HAGEMAN, R. H., AND PAGAN, C.

The effect of ridging on ease of harvest, root distribution, and toxic constituents of *Derris elliptica*.

*Trop. Agriculture, Trin.*, 1950, 27: 98-104, bibl. 8.

A summary of this work was abstracted in *H.A.*, 20: 1562.

e HENRIET, J.

Note sur les déterminations de la roténone dans les racines de derris. (The determination of rotenone in derris roots.)

*Parasitica*, 1950, 6: 117-18.

f HENRY, A. J., AND KING, H.

The isolation and identification of (-)-stachydrine ethyl ester periodide from the root of *Courbonia virgata*.

*J. chem. Soc. Lond.*, 1950, pp. 2866-8, bibl. in text.

The compound has curare-like properties.

g HEROUT, V., AND OTHERS.

On terpenes XXI. On the terpenic and sesquiterpenic hydrocarbons from Bergamot oil.

*Coll. Czech. chem. Commun.*, 1950, 15: 373-80, bibl. 10.

- h KRISHNA RAO, G. S., SUKH DEV, AND GUHA, P. C.  
On the essential oil from the oleo-resin of *Dipterocarpus indicus*.  
*Sci. and Cult.*, 1950, 16: 74-5, bibl. 5.

- i KUNDU, B. C.  
Cultivation of "ramie" plant [*Boehmeria nivea*.]  
*Indian Fmg.*, 1950, 11: 169-71.

- j MANSKE, R. H. F.  
The alkaloids of fumariaceous plants. XLV. Coreximine, a naturally occurring coralydine. *J. Amer. chem. Soc.*, 1950, 72: 4796-7, bibl. 6.  
The plant source of coreximine is *Dicentra eximia*.

- k THIRUMALACHAR, M. J., AND PAVGI, M. S.  
Sooty stripe disease of bamboo in India. *Bull. Torrey bot. Cl.*, 1950, 77: 385-8, bibl. 4, illus.  
Caused by *Papularia arundinis* (Corda) Fr.

## FLORICULTURE.

### General.

(See also 1325, 1927, 1950d, 2117, 2127, 2136, 2172.)

1871. MARTÍNEZ CROVETTO, R.  
Notas sobre plantas indígenas cultivadas en la Argentina. (Notes on some indigenous plants cultivated in Argentina.)  
*Rev. Invest. agric. B. Aires*, 1948, 2: 105-16, bibl. 32 [received 1951].

Notes are given on 50 indigenous plants, belonging to 26 families, which have been grown in Argentina for decorative or other purposes. Many of them have not previously been recorded as being cultivated, or are little known.

1872. CORTVRIENDT, S. F., VAN HOLDER, J., AND VAN ONSEM, J. G.  
Proeven over het gebruik van groeistoffen bij het stekken van allerlei gewassen. (Experiments in the use of hormones on cuttings of ornamental plants.) [Summaries in English, French and German  $\frac{1}{2}$  p. each.] Reprinted from *Meded. LandbHogesch. OpzStat. Gent*, 1950, Vol. 15, Nos. 2 and 3, as *Meded. Leerstoel Tuinb. Rijksstat. Sierplantenvered.*, 1950, pp. 57.

The results are tabulated of experiments in the hormone treatment of cuttings of a large number of ornamental plants belonging to 79 families. Conifers, monocotyledons and woody and herbaceous dicotyledons were included. The growth substances  $\beta$ -indolebutyric acid,  $\beta$ -indoleacetic acid,  $\alpha$ -naphthaleneacetic acid, benzoic acid and xanthine were used in powder form. The trials were carried out mainly in the glasshouses of the Rijkslandbouwhogeschool, Ghent, but in some cases in commercial nurseries.

1873. PEETERS, F.  
Automatische wateropname met wicken. (Water taken up automatically by means of wicks.)  
*Cult. Hand.*, 1950, 16: 363-4, illus., adapted from article in *Schweiz. Gartenbau Bl.*

The use of wicks made of glass threads for automatically applying water to pot plants is described.

1874. BOSSARD, R., AND VERDIER, M.  
À propos de la conservation des fleurs. (The conservation of cut flowers.)  
*Rev. hort. Paris*, 1951, 123: 314-15, bibl. 1, illus.

At the National School of Horticulture, Versailles, preliminary tests were carried out to determine the

effect on the keeping quality of dahlias of a number of materials added to the water in which the flowers were standing. The materials included sodium chloride, potassium permanganate, silver nitrate, ortho-oxy-quinoline sulphate, sodium hydroxide, sulphuric acid, copper sulphate, aspirin and some compound solutions. The flowers lasted better in aerated tap water than in ordinary tap water or water in which dahlias had been standing previously. Clean containers and frequently renewed water seemed to be more effective than any of the chemicals, but the use of certain chemicals, notably a proprietary substance containing silver nitrate, prolonged the life of the flowers for 3-4 days.

### Annuals and herbaceous plants.

(See also 1716, 1950e, f, i, k, l, m, 2119, 2121, 2135, 2138, 2157.)

1875. SINICKAJA, D. A.  
Vegetative hybrids obtained from grafting certain ornamental plants of different genera and families. [Russian.]  
*Priroda* (Nature), 1950, 39: 9: 64-5, illus.

Grafting experiments are described using tobacco, petunia, aster and dahlia, particularly the reciprocal grafting of *Nicotiana affinis* and *Petunia hybrida*. Success was also obtained with aster on dahlia and vice versa, and tobacco on dahlia. It is claimed that new forms may be obtained in this way.

1876. THIEL, J.  
Enkele gebrek-ziekten bij kasplanten. (Some deficiency diseases of greenhouse plants.)  
*Cult. Hand.*, 1950, 16: 536-8.

Mineral deficiency symptoms are described for begonia, calceolaria, chrysanthemum, cineraria, pelargonium, poinsettia (*Euphorbia pulcherrima*), and *Primula obconica*.

1877. THUNG, T. H., AND HADIWIDJAJA, T.  
Het overbrengen van viren met behulp van *Cuscuta australis* R.Br., I. (Virus transmission by *Cuscuta australis* R.Br., I.) [English summary 4 lines.]  
*Tijdschr. PlZiekt.*, 1950, 56: 349-51, bibl. 5.

The yellow-vein-banding mosaic of *Ageratum conyzoides* and the witches' broom virus of *Crotalaria usaramoensis* were transmitted by *Cuscuta australis*.

1878. ZOHARY, M.  
Carpobiological notes on *Alyssum*.  
*Palest. J. Bot. (J.)*, 1949, 4: 239-40, bibl. 3 [received 1951].



An examination of several annual species of *Alyssum* of the Near East has shown that, although the silicle is uniform throughout the genus, the following dispersal types exist: anemochorous spp., ombrochorous spp. and ombrochorous-hydrochastic spp.

1879. WAHL, I.

**Snapdragon rust (*Puccinia antirrhini* Diet. et Holway) in Palestine.**

*Palest. J. Bot. (J)*, 1949, 4: 225-9, bibl. 12, illus. [received 1951].

Snapdragon rust, first found in Palestine in 1936, has done serious damage to cultivated *Antirrhinum majus*, but has not attacked the wild native species, *A. siculum* Ucr. The fungus and its seasonal development are briefly described, as are studies on the germination and heat-resistance of the uredospores and the germination of teliospores. Studies are also reported on the transmission of the disease, physiological changes in the snapdragon caused by the rust, the cytology of the fungus and host, and the influence of certain fungicides on the germination of uredospores. In pot experiments the inclusion of 0.58 g. KCl per l. water in a nutrient solution was found to increase the resistance of the plants to rust; this effect became more marked when the KCl concentration was increased 3 to 5 times, but when it was further increased to 8 times the effect on resistance declined.

1880. HOLLEY, W. D., AND FARMER, R.

**Cold storage of carnation cuttings.**

*Colo. St. Flower Grs' Bull.*, 1950, No. 10, pp. 1-3, from abstr. in *Bull. N.Y. St. Flower Gr.*, 1950, No. 63, p. 5.

Carnation cuttings were sealed in MSAT cellophane as they came from the stock plant with a small amount of sphagnum in the package and were stored at 30° or 40° F. Storage in darkness for 73 to 113 days gave rooting of 76% to 92%, or as good as fresh cuttings. Differences in rooting at 30° and 40° were probably not significant.

1881. TOYOMURA, S., AND YOSIOKA, S.

**The effect of light on the rooting of cuttings.**

[Japanese, German summary.]

*Bul. sci. Fak. Terkult. Kyūsyū imp. Univ.*, 1939, 8: 204-30, from abstr. in *Jap. J. Bot.*, 1940, 11: (37) [received 1950].

Root formation on cuttings of *Chrysanthemum sinense* and *Coleus blumei* and bud formation on leaves of *Bryophyllum calycinum* occurred more rapidly in weak light than in strong, but for the further development of regenerated material a strong light gave better results.

1882. POPHAM, R. A., AND CHAN, A. P.

**Zonation in the vegetative stem tip of *Chrysanthemum morifolium* Bailey.**

*Amer. J. Bot.*, 1950, 37: 476-84, bibl. 48, illus.

The histological structure of chrysanthemum buds was studied in the course of investigations on the causes, and methods of prevention, of "crown bud" formation. Five zones were noted in the shoot apex: a mantle, a group of central initials, a zone of cambial-like cells, a rib meristem, and a peripheral zone. These are described in detail and the course of development of the zones is traced. It is noted that this zone pattern, though observed in some monocotyledons

and gymnosperms, has only been reported as occurring in three other dicotyledons. The presence of the cambial zone is correlated with large apex diameter. Theories of shoot apex development and the origin of foliar organs and stem tissues are discussed.

C.W.S.H.

1883. SCHWABE, W. W.

**Factors controlling flowering of the chrysanthemum. I. The effects of photoperiod and temporary chilling.**

*J. exp. Bot.*, 1950, 1: 329-43, bibl. 23, illus.

Plants were kept under short-day (8 hrs. daylight) and long-day conditions. The latter consisted of 8 hrs. daylight plus 8½ hrs. under incandescent lamps. Low temperature (vernalization) treatments, involving chilling for various lengths of time, were given to some plants of each lot. Vernalization was necessary for, or accelerated, the flowering of the plants and a period of 3 weeks was sufficient. Short-day plants without vernalization grew diageotropically and remained vegetative for long periods. Long-day plants grew vegetatively but otherwise normally. Vernalization may be discontinuous and is more effective in the dark than in the light phase. No stimulus was carried over from one year to the next.

C.W.S.H.

1884. BEWLEY, W. F., AND RICHARDS, A. A.

**Mosaic disease of the chrysanthemum.**

*Gdnrs' Chron.*, 1951, 129: 20, bibl. 3, illus.

The symptoms of this increasingly important virus disease are described. Varieties in which infection has been observed are Baldock's Crimson, Cheshunt White (Autocrat), Christmas Beauty, Favourite, Florina, Friendly Rival, Imperial Pink, Imperial Rose, Molly Nicholson, Monument, Santa Claus, Solomon and Rose Harrison. Cuttings should not be taken from infected plants, and aphid vectors should be controlled as soon as they appear.

1885. TOMPKINS, C. M., AND MIDDLETON, J. T.

**Control of basal rot of cuttings of chrysanthemum and other ornamentals.**

*Bull. Torrey bot. Cl.*, 1950, 77: 287-93, bibl. 11.

The symptoms of basal rot of chrysanthemum cuttings (caused by *Pythium ultimum*), as seen in clothhouse cutting benches in California, are brownish-black, water-soaked lesions at or near the base of cuttings. Infection spreads upward in the stems and downward into the roots, discolouring all tissues. Wilting may occur in advanced stages of infection. The disease can be controlled by dusting the basal ends of the cuttings with a mixture of Ferbam and Celite 505 before planting.

1886. STANILAND, L. N.

**Experiments on the control of chrysanthemum eelworm (*Aphelenchoides ritzema-bosi*, Schwartz) by hot water treatment.**

*Ann. appl. Biol.*, 1950, 37: 11-18, bibl. 9, illus.

Laboratory experiments were undertaken to find the time taken to kill the eelworms at temperatures varying from 109° to 126° F. From the results, three treatments were selected in 1948 for trial on the stools of a number of chrysanthemum varieties: Soaking in water at 110° F. for 30 min. (the old standard treatment), at 115° F. for 5 min., and at 130° F. for 1 min. The

higher temperature treatments were better for all varieties, and it is recommended that 115° F. for 5 min. should take the place of 110° F. for 20-30 min.; but that if the latter temperature is used then it should be maintained for the full 30 min. Pots, boxes, etc., may be rapidly sterilized by plunging into water in excess of 126° F. Stools should be cut down to 8-9 inches in length. C.W.S.H.

1887. STANILAND, L. N.

Notes on the use of iodine and chlorphenol against certain plant nematodes.

*J. Helminth.*, 1950, 24: 91-9, from abstr. in *Helminth. Abstr.*, 1950, 19: 89.

With *Aphelenchoides ritzema-bosi* in dried chrysanthemum leaves, one hour's soaking in 0.25% chlorphenol kills all eelworms. Infected seed of onion is successfully treated with iodine solution (1:4,000) for 10 min. or 0.5% chlorphenol for 20 min. Germination is delayed slightly but the percentage germination is not reduced. Chlorphenol at 0.25% is used in the bath for hot-water treatment of bulbs, together with a "wetter". It is also used for washing down all staging, walls, floors, etc., of the sheds in which treatment is carried out. Chlorphenol has very little phytocidal action. "Dichlorphenol" (40% chlorine) is about three times as efficient as chlorphenol. Some preliminary experiments on the use of chlorphenol against cysts of *Heterodera rostochiensis* are described.

1888. BEAUMONT, A.

Diseases of dahlias.

*Gdnrs' Chron.*, 1950, 128: 247.

The following diseases of the dahlias and their control are briefly described: Damping off caused by *Phytophthora cryptogea*, *Rhizoctonia solani* and *Botrytis cinerea*; wilting caused by *Verticillium dahliae* and *Sclerotinia sclerotiorum*; leaf spots caused by *Entyloma dahliae* and *Ascochyta dahliae*; crown gall, *Bacterium tumefaciens*; leafy gall, *Corynebacterium fasciens*; and dahlia mosaic, tomato-spotted wilt and cucumber mosaic.

1889. CARTER, A. R., AND WILLIS, S. J.

Damage to *Geum* and *Potentilla* by

*Rhynchites germanicus* Herbst and *Anthrenus rubi* Herbst (Col., Curculionidae).

*Ent. mon. Mag.*, 1950, 86: 356-7.

The two species of weevil, known as pests of strawberries and forms of *Rubus*, are now reported as also damaging *geum* and *potentilla*.—Hertfordshire Inst. Agric., St. Albans.

1890. ALEKSANDROV, F. A.

The biology of the perennial lupin. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1949, 67: 1133-4, bibl. 6.

The perennial lupin (*Lupinus polyphyllus*) starts re-growth in the spring and reaches maturity in advance of clover (*Trifolium pratense*), a result of its retention of young root nodules through the winter.

1891. YASUDA, S.

An experiment concerning the problem of seed setting by means of bud-pollination in self-incompatible *Petunia violacea*.

*Proc. imp. Acad.*, 1939, 15: 359-61, from abstr. in *Jap. J. Bot.*, 1940, 11: (43) [received 1950].

*Petunia violacea*, a self-incompatible species, will set seeds when the flowers are self-pollinated in the bud stage. The author has proved that this fact is not due to the shortness of the style in the bud, and suggests that it may be explained by a lack of inhibiting substance in the pistil of the immature flower.

1892. STIRLING, W. F.

Boiling water keeps Iceland poppies fresh.

*Grower*, 1950, 34: 1059.

Following notes on the propagation and cultivation of Iceland poppies for cut flowers it is mentioned that, after picking, the ends of the stems should be placed in boiling water for 30 secs. and the flowers then allowed to stand in cold water for 4 to 6 hours. Without the boiling water treatment the flowers will not last nearly so well.

1893. MARTÍNEZ CROVETTO, R.

Los "*Solanum*" ornamentales cultivados en la Republica Argentina. (Species of *Solanum* grown for ornament in Argentina.)

*Rev. Invest. agric. B. Aires*, 1948, 2: 179-95, bibl. 17, illus. [received 1951].

Of the 11 species of *Solanum* grown for ornamental purposes in Argentina, 8 are indigenous and 3 introduced. An identification key is given, followed by notes on the individual species and botanical illustrations of 7 of them.

1894. CRICHTON, M. I.

Slugs feeding on mealybugs.

*Ent. mon. Mag.*, 1951, 87: 20.

Slugs were observed feeding on the mealybug *Pseudococcus citri* infesting pot plants of *Streptocarpus kewensis* in a glasshouse at Reading University.

1895. VALENTINE, D. H.

The experimental taxonomy of two species of *Viola*.

*New Phytol.*, 1950, 49: 193-212, bibl. 42, illus.

The European species *Viola riviniana* Rehb. (n=20) and *V. reichenbachiana* Jord. (n=10) are briefly described. The species are very alike vegetatively but fairly easy to distinguish by floral characters. Hybridization shows that they are completely compatible, the F<sub>1</sub> hybrids being uniform and vigorous. A brief account is given of 9 plants obtained by selfing F<sub>1</sub> hybrids. An F<sub>2</sub> generation has been reared, but seed from back crosses has not germinated.—Durham University.

*Bulbs, tubers, etc.*

(See also 1376, 1553, 1950b, j, 2159.)

1896. GOULD, C. J.

Progress report on bulb research for 1949/50.

[Publ.] *West. Wash. St. Exp. Stat.*, 1950, pp. 8.

This brief report, presented to the Annual Meeting Northwest Bulb Growers' Association, contains notes and recommendations on the following subjects: pre-emergence sprays for weed control in daffodils and irises; mercury treatment of daffodil and narcissus bulbs; fertilizer trials with daffodils and irises; warm curing treatment of narcissus bulbs; iris blindness;



crown rot control in irises; and Tersan treatment of iris bulbs.

1897. BEAUMONT, A.

Diseases of arum lilies.

*Gdnrs' Chron.*, 1951, 129: 61-2, illus.

Descriptions and control measures are given for the following: bacterial soft rot, *Bacillus aroideae*; root rot, *Phytophthora richardiae*, *Thielaviopsis basicola* and *Rhizoctonia solani*; white root rot, *Rosellinia necatrix*; leaf spot, *Phyllosticta richardiae*. Of the virus diseases, the tomato spotted wilt is particularly prevalent, cucumber mosaic being less common.

1898. KARASAWA, K.

Karyological studies in *Crocus* III.

*Jap. J. Bot.*, 1943, 12: 475-503, bibl. 26, illus. [received 1950].

Karyological observations were made on a number of garden varieties of *Crocus vernus* and on some rare species. The relation between chromosome number and both taxonomy and geographical distribution is discussed.

1899. KARASAWA, K.

On the leaf structure of *Crocus* observed in transverse sections and their chromosome number. [Japanese.]

*Bot. Mag. Tokyo*, 1942, 56: 19-25, illus., from abstr. in *Jap. J. Bot.*, 1943, 12: (44) [received 1950].

In a study of a number of species and varieties of crocus, no relationship was observed between leaf structure and chromosome number.

1900. BAKER, K. F., DIMOCK, A. W., AND DAVIS, L. H.

*Ramularia cyclaminicola* Trel., the cause of cyclamen stunt disease. *Phytopathology*, 1950, 40: 1027-34, bibl. 12, illus.

Two cyclamen diseases (*Ramularia* leaf disease and stunt) and a wilt here described are phases of a single trouble caused by *Ramularia cyclaminicola*. The systemic invasion of shoots and roots causes wilting of the whole plant.

1901. KOFRANEK, A. M.

Spike and corm production of glads influenced by depth of planting.

*Flor. Exch.*, 1951, 116: 2: 12, bibl. 3.

Experiments, conducted in the 1948 and 1949 seasons at Cornell, showed that planting gladiolus corms of 3 varieties at a depth of 6 inches in a clay soil markedly decreased spike and corm production. In general, it was found that planting 2 in. and 4 in. deep resulted in significantly greater production of spikes than planting 6 in. deep; that the 2 in. and 4 in. planting depth produced more corms than the 6 in. depth, but the 6 in. depth produced the largest corms by weight. There was practically no difference in the average date of blooming nor in quality of the spikes for the three different planting depths.

1902. MCCLELLAN, W. D., AND STUART, N. W.

Effect of nitrogen fertilizer on severity of glad diseases.

*Flor. Exch.*, 1950, 115: 24: 18, 62.

Fertilizer trials in the field, under glass and in water

and sand cultures, carried out by the U.S. Department of Agriculture since 1943, have shown that applying increasing amounts of both organic and inorganic nitrogen resulted in greater losses due to fusarium rot. Bacterial scab was also found to be increased by N applications. Growth of fusarium in culture was 5 times greater with high levels of nitrogen than with low levels, and the growth of curvularia in culture was similarly affected.

1903. GOULD, C. J.

Glad dry rot tests in Western Washington.

*Flor. Exch.*, 1951, 116: 1: 10.

Corms dipped for 1 hr. in Tersan and Natriphene before being planted appeared to be stimulated by the treatment, whereas Mersolite-W (phenyl mercuric acetate) retarded both the rate of emergence and blooming. When the corms were harvested, however, the Mersolite treated plants produced the largest yield of healthy corms, followed by Tersan, while Natriphene treated plants were almost as poor as the untreated controls.

1904. KOCH, L. W.

A bacterial soft rot of gladiolus.

*Sci. Agric.*, 1950, 30: 483-7, bibl. 4, illus., being *Contr. Div. Bot. Plant Path., Sci. Serv., Dep. Agric. Ottawa 1039*.

A soft rot of gladiolus appeared suddenly in Ontario in 1949. Isolations on potato dextrose agar from diseased tissue gave white spherical bacterial colonies with gram-negative, short rod bacteria, single or in chains. Inoculated healthy gladiolus plants, onion plants and potato and carrot cubes rotted within 5-14 days. Tobacco stalks were unaffected. Re-isolations from the inoculated gladiolus plants yielded similar bacteria. The organism resembles *Erwinia carotovora*, and all symptoms are similar to soft rot of vegetables ascribed to this bacterium. C.W.S.H.

1905. AITKENHEAD, P.

The gladiolus thrips—a pest new to Britain.

*Agriculture, Lond.*, 1951, 57: 517-23, bibl. 14, illus., map.

The gladiolus thrips, *Taeniothrips simplex* (Morison), was first recorded in Britain in July 1950, since when it has been found over a wide area. The main symptoms of damage in summer are silvering of all green parts and mottling of the flowers beginning in the bud stage; and on the corms, similar patches of silvering which later turn brown and rough. In describing the life history of the thrips, it is stated that it is unlikely to survive the winter out of doors in Britain and survival will probably depend on corm infestation. Methods of control adopted in other countries are reviewed. For summer control the most successful sprays appear to be a BHC emulsion containing 0.1 lb. gamma isomer and a chlordane emulsion containing 0.5 lb. active material per 100 gal. water. In Australia, DDT (3 fl. oz. of 20% DDT to 3½ gal. water) is in general use, but in two trials in England it was unsuccessful, due probably to the first application being made too late. Winter control measures used or being tested in other countries include fumigation with naphthalene, methyl bromide or calcium cyanide, dipping in mercuric chloride, warm water and parathion, and dusting with 5% DDT which is officially recommended in the U.S.A.

1906. SKILLMAN, E.

**The gladiolus thrips.**

*Gdnrs' Chron.*, 1950, 128: 182, illus.

The pest, *Taeniothrips simplex*, was first found in Britain in the summer of 1950 attacking outdoor gladioli. On a holding in the north London area, red and purple varieties appeared to be most susceptible to attack, the pink variety Rosa van Lima showed slight resistance, and the white variety Snow Princess, adjoining severely infested red varieties, showed comparative immunity. A fair control was obtained by spraying four times, at approximately 5-day intervals with a mixture of 6 oz. of 20% wettable DDT and  $\frac{1}{2}$  pt. of white oil in 6 gal. of water.

1907. PAPE, H.

Schäden durch den Gladiolenblasenfuss in Deutschland. (The injury caused by the gladiolus thrips in Germany.)

*NachrBl. dtsh. PflSchDienst., Braunschweig*, 1951, 3: 19-20, illus.

The pest *Taeniothrips simplex* (= *T. gladioli*) is well known in America, but is new to Germany.

1908. SACHS, H.

*Rhabditis brevispina* Claus in kranken Blütenständen von Hyazinthen. (*Rhabditis brevispina* Claus in diseased hyacinth stems.)

[English and French summaries  $\frac{1}{2}$  p. each.] *Höfchen Briefe*, 1950, 3: 5: 31-7, bibl. 5, illus.

Of 26 young hyacinth inflorescences showing tip rotting, 23 were found to be infested by *Rhabditis brevispina*. While the literature describes *Rhabditis brevispina* as a semi-parasite, the author provides evidence to show the purely saprophytic character of the nematode. Where nematodes are present on decomposing plant material, it is advisable to sprinkle both healthy and diseased plants with 0.075% E605 forte, to prevent the nematode larvae from spreading pathogenic organisms.—Zoological Institute, Univ. Erlangen.

1909. KUSHNIR, T.

**Leaf spot diseases of Iris in Palestine.**

*Palest. J. Bot. (J.)*, 1949, 4: 230-3, bibl. 2 [received 1951].

Observations recorded on several species of iris suggested that different species show different degrees of resistance or immunity to *Septoria iridis* and *Heterosporium gracile*, both of which cause leaf-spot diseases. The results of an inoculation experiment involving both fungi and 10 different species of iris are tabulated and discussed briefly.

1910. SEALY, J. R.

**Nomocharis and Lilium.**

*Kew Bull.*, 1950, No. 2, pp. 273-97, illus.

The two genera are compared as regards their bulbs, the shape of the perigone, their nectaries, stamens and gynoecium, and the points in which they differ distinctly are summarized. Eight doubtful species are then discussed with special reference to those characters in which they differ from true species of one or other of the genera, and suggestions are made in some cases for revising their nomenclature. These species, with a

number of their varieties, are re-described under their proposed new names. The text is fully illustrated.

1911. SAKAGUCHI, M.

**A sclerotium disease of narcissus.** [Japanese, English summary.]

*Ann. phytopath. Soc. Japan*, 1941, 11: 115-35, illus., from abstr. in *Jap. J. Bot.*, 1942, 12: (23)-(24) [received 1950].

The symptoms of the disease, probably caused by *Sclerotium gladioli*, and the artificial culture of the fungus are discussed.

1912. BEAUMONT, A.

**Observations on narcissus leaf scorch in south-west England.**

*Ann. appl. Biol.*, 1950, 37: 591-6, bibl. 5.

Narcissus leaf scorch caused by *Stagonospora curtisii* (Berk.) Sacc. is very common in south-west England, where it causes economic damage arising from flower spot and leaf decay. Information is given as to the varying susceptibility of many different varieties, a comparative measure of which is obtained by counting the primary infections. No certain control measures can be recommended, but results of experiments on bulb disinfection and on spraying are given. [Author's summary.]

1913. EUNUS, A. M.

**Contributions to the embryology of the Liliaceae. IV. Gametophytes of *Smilacina stellata*.**

*New Phytol.*, 1950, 49: 269-73, bibl. 7, illus.

The arrangement of the floral parts and the cytology of the reproductive organs are described.

1914. STERN, F. C.

**Snowdrops and snowflakes.**

*J. roy. hort. Soc.*, 1951, 76: 73-7, illus.

Points of difference between snowdrops (3 series of *Galanthus* spp.) and snowflakes (*Leucojum* spp.) are mentioned, and a number of species of each are briefly described.

1915. PARKER, M. W., STUART, N. W., AND BORTHWICK, H. A.

**Preliminary results on the effect of low-intensity artificial light on forcing tulips.**

*Flor. Exch.*, 1950, 115: 23: 11, bibl. 2.

Trials have shown the possibility of forcing tulips with artificial light from incandescent-filament lamps and perhaps from fluorescent types. The colour of the tulips remained unaffected, the size of buds was influenced only slightly, but the length of stems varied with light intensity. The response of 4 varieties tested varied greatly, and certain varieties of tulips may prove to be better adapted to forcing with artificial light than others.—U.S. Dep. Agric., Beltsville, Md.

**Orchids.**

1916. GONZÁLEZ LUGO, E.

La orquídea *Cattleya labiata* var. *speciosissima*. (*Cattleya labiata* var. *speciosissima*.) *Agric. venezol.*, 1950, 15: 144: 4-6, illus.

This variety, which is here described, is indigenous to



the states of Aragua, Bolívar, Carobobo and Yaracuy in Venezuela. In its native habitat it grows in full light and flowers during the dry season of November-February. When grown in artificial conditions, therefore, it should not be subjected to excessive shade, and should not be watered more than once in every 8-10 days during the flowering period. It will not grow well in pots, and baskets or logs of wood are recommended. Plants collected from their native habitat should be dipped in an insecticide (0.3-0.5% DDT) before being planted. The variety has been grown successfully in Caracas at an altitude of 950 m. and temperatures ranging from 12° C. in December-May to 28° C. in August-October.

1917. HAWKES, A. D.

**Studies in Florida botany. 3. A new variety in *Epidendrum tampense* Lindley.**  
*Lloydia*, 1950, 13: 163-4, illus.

A description, with a photograph of the type specimen, of *Epidendrum tampense* Ldl. var. *albolabium* A. D. Hawkes, var. nov., which differs from typical *E. tampense* in having no distinctive coloration of the lip.

1918. HAWKES, A. D.

**Orchid notes. 1. A new species of *Gomesa* R. Brown from Colombia.**  
*Lloydia*, 1950, 13: 227-8.

A taxonomic description is given of an attractive dwarf epiphyte, *Gomesa erectiflora* A. D. Hawkes, sp. nov.

1919. GILBERT, J. C., MAINLAND, G. B., AND LOHMAN, M. L.

**Heat treatments for diseased orchid plants.**  
*Bull. Pacific Orchid Soc. Hawaii*, 1950, 8: 289-93, from abstr. in *Bull. N.Y. St. Flower Gr.*, 1950, No. 63, p. 5.

Two methods of heating orchid plants to control a species of *Phytophthora* fungus were used. In the first method, inoculated *Cattleya* plants were placed in a forced-draft type poultry incubator at 107° F., 90% relative humidity, for 24 hours and 66 hours. All plants showed injury but new healthy growths were produced later. In the second method, inoculated plants were exposed to vapour heat at 116° F. or 120° F. for 39 minutes to 1 hour and 25 minutes. With this treatment *Vanda* Miss Joaquim cuttings were killed while *Dendrobium* Sander's Crimson and *Cattleya* plants, although initially injured, developed new leads. Diseased *Cattleya* plants exposed to vapour heat at 116° F. for 15 to 30 minutes showed no apparent heat injury while the *Phytophthora* fungus growth was checked. Untreated plants were either partially or completely killed by the fungus.

1920. GÄUMANN, E., BRAUN, R., AND BAZZIGHIER, G.

**Über induzierte Abwehrreaktionen bei Orchideen. (Induced resistance in orchids.)**  
*Phytopath. Z.*, 1950, 17: 36-62, bibl. 14, illus.

A fungus-inhibiting secretion of the tubers of *Orchis militaris* is described. It probably arose as an effect of the spontaneous infection of the tubers by the mycorrhizal fungus *Rhizoctonia repens*. The secretion is not specific in its action; it has an inhibiting effect on *Fusarium solani*, for example.

## Roses.

(See also 1319, 1449, 2151.)

1921. OLIVER, R. W.

**Outdoor roses in Canada.**

*Publ. Canada Dep. Agric.*, 777, revised 1950, pp. 34.

This admirable guide for Canadian rose-growers was first issued in 1946 and has been fully abstracted in *H.A.*, 16: 1570. This revised edition contains a few, very minor amendments.

1922. BACCIALONE, J.

**Le rosier sur la Côte-d'Azur. (Rose growing in the Côte d'Azur.)**

*Rev. hort. Paris*, 1950, 122: 284-91, illus.

Rose growing is a very important industry in the south of France. In this article are described the methods of propagation, mainly by grafting onto *Rosa indica-major*, and the methods of growing roses for ornament in gardens, with a list of the best varieties, for the cut flower trade in the open and under glass, and for the perfume industry. About 700 ha. are devoted to the production of roses for perfume in the Alpes-Maritimes.

1923. ANON.

**L'engrais Geistlich pour rosiers. (The Geistlich fertilizer for roses.)**

*Rev. hort. suisse*, 1951, 24: 100-1.

In trials at Châtelineau the following, so-called Geistlich fertilizer is stated to have given excellent results with roses: 13% total phosphoric acid, of which 5% is water-soluble; 5% nitrogen; 10% potash, free of chlorine; 15% lime; 5% magnesium sulphate. The fertilizer has an organic base. It should be applied to established plantations in February and May at the rate of 150-200 gm./m<sup>2</sup>, with possibly a lighter application in July.

## Shrubs and trees.

(See also 1455, 1472, 1517, 1839, 1950a, c, g, h, 2114, 2116, 2119.)

1924. SMITH, B. C.

**Cleaning and processing seeds.**

*Amer. Nurserym.*, 1950, 92: 11: 13-14, 33-5, bibl. 4.

Methods and machines for extracting and cleaning seeds of trees and shrubs for propagation purposes are discussed, with particular reference to methods useful to the nurseryman handling only limited quantities of seed.

1925. WALKER, J.

**Production of some trees and shrubs from seeds.**

*Rep. Proc. west. Canad. Soc. Hort.*, Winnipeg, 1950, pp. 62-5.

A brief summary is given of experience gained in the propagation of ornamental plants at the Forest Nursery Station, Indian Head, Sask. A list of 30 trees and shrubs with instructions for sowing, dates of emergence and age at which to plant out is included.

1926. GOURLAY, W. B.

**Town trees and telephone wires.**

*J. roy. hort. Soc.*, 1951, 76: 64-5, illus.

A brief note about the purple plum (*Prunus cerasifera*

var. *atropurpurea*, but more commonly known as *P. pissardii*) grown along a roadside in Cambridge, being affected by drip from overhead telephone wires. The trees had a one-sided, "wind-pruned" appearance, while almonds, thorns, and Japanese cherries grown together with the plums were only slightly or not at all affected.

1927. FILLMORE, R. H.

Soil substitutes save shipping weight.

*Amer. Nurserym.*, 1951, 93: 1: 7-8, bibl. 5, illus.

Flowerite, Styrofoam A, sphagnum moss and sphagnum peat moss have been successfully used to prepare various lightweight soils and soil substitutes for use in the distribution of rhododendron seedlings. Clay flower pots and Vita-Band 10 plant bands have been equally satisfactory as containers.—Arnold Arboretum.

1928. GAMBRELL, F. L., AND STRICKLAND, L. F.

Control of white grubs in nursery plantings.

*J. econ. Ent.*, 1950, 43: 550-2, bibl. 4, being *J. Pap. N.Y. St. agric. Exp. Stat.* 821.

White grubs, *Phyllophaga* spp., and rose chafer grubs, *Macrodactylus subspinosus*, cause serious losses in young coniferous plantings. Soil applications of BHC, chlordane and parathion have shown a high degree of efficiency in the control of second and third instar grubs under greenhouse conditions and were found promising when used in the nursery. DDT, while less effective than the above insecticides, gave better control than lead arsenate.

1929. GOVINDU, H. C.

Studies in the embryology of some members of the Bignoniaceae.

*Proc. Indian Acad. Sci., Sect. B*, 1950, 32: 164-78, bibl. 13, illus.

The species studied were *Jacaranda mimosaeifolia*, *Kigelia pinnata*, *Parmentiera cerifera* and *Tecoma stans*. The text is accompanied by 114 figures.

1930. TARIAN, A. C.

Parathion—its action against the meadow nematode.

*Agric. Chemls*, 1950, 5: 12: 32-4, 95, bibl. 2, illus.

In a series of greenhouse and field tests, 25% wettable parathion was used as a treatment for meadow nematode-infested English boxwoods. Under both greenhouse and field conditions, nematode populations in the treated plants were reduced significantly without causing apparent plant injury. It was pointed out that although an effective reduction of the root nematode populations was obtained, it is too early yet to evaluate the effect of treatment on plant growth.—Bureau of Plant Industry, Beltsville, Md.

1931. GILL, D. L.

DDT injury to camellias.

*Amer. Nurserym.*, 1950, 92: 11: 7-8, bibl. 7, illus.

Tests were carried out at the Spring Hill laboratory of the Alabama State Department of Agriculture with cuttings of a number of camellia varieties rooted in DDT-treated potting compost to determine the varietal susceptibility to DDT injury. DDT was mixed with the compost at the rate of 4 oz. 50%

wettable powder per cubic yard (the amount recommended for white-fringed beetle control) and at double this rate. At both rates of application injury occurred to *Camellia japonica* varieties Cheerful, Mrs. K. Sawada, Imura, Victoria Maid, K. Sawada and Catherine Cathcart, and to *C. saluenensis* variety Appleblossom. Inhibition of rooting and a slight yellowing of the leaves was followed by death of the buds and leaf fall. The author discusses the observations of other workers on this subject. Further experimental work is needed to determine the effects of DDT sprays on camellia foliage.

1932. BRAUN, A. C.

A tumor-inducing bacterium isolated from *Euonymus* galls.

*Phytopathology*, 1950, 40: 1058-60, bibl. in text.

An organism isolated from galls in a heavily infested hedge of *Euonymus fortunei radicans* caused typical crown-galls on tomato, sunflower, *Kalanchoe* and sugar-beet plants, but little or no pathogenic reaction on the Paris daisy.

1933. TEUSCHER, H.

*Ginkgo biloba* from cuttings.

*Amer. Nurserym.*, 1951, 93: 2: 7.

Shoots, about 10 in. long, growing on a 10-year-old tree were cut off close to the base at the end of June. The soft tips were removed, thus leaving semi-hardwood cuttings about 5-6 in. long. The bases of these were dusted with the hormone powder Auxan and were inserted about 3 in. deep into a mixture of two-thirds sharp sand and one-third peat moss in a cold frame without bottom heat. The cuttings showed 100% rooting within 3 weeks. The softer tips treated in the same manner died. Two months after the cuttings were taken the young plants possessed a mass of healthy roots and were potted, preparatory to planting the following spring.—Montreal Botanical Garden.

1934. GRAVES, G.

Asiatic and native magnolias.

*Amer. Nurserym.*, 1950, 92: 11: 30-3.

Notes on the characteristics of species and varieties found in eastern Asia and the eastern United States.

1935. ANON.

Mimosa trees immune to wilt-causing fungus.

*Amer. Nurserym.*, 1950, 92: 11: 51-2.

A note on the fusarium-resistant strains of mimosa that are being developed at the Tyron nursery of the U.S. Department of Agriculture. The strains may be easily propagated by root cuttings.

1936. KRAPOVICKAS, A.

Las especies de "*Sphaeralcea*" de Argentina y Uruguay. (Species of *Sphaeralcea* in Argentina and Uruguay.) [English abstract 10 lines.]

Reprinted from *De Lilloa*, Vol. 17, pp. 179-222, bibl. 52, illus., as *Publ. téc. Inst. Bot. B. Aires* 29 (n.s.), 1949 [received 1950].

In this revision of the genus *Sphaeralcea*, the taxonomic importance of the shape of the fruit and inflorescence is stressed. Observations are made on the geographical distribution and the cytology of its species.



1937. DIMITRI, M. J.

Nota aclaratoria sobre la existencia de "*Aglaiia odorata*" en la Argentina. (An explanatory note on the occurrence of *Aglaiia odorata* in Argentina.)

Rev. Invest. agric. B. Aires, 1949, 3: 43-5, bibl. in text, illus. [received 1951].

*Trichilia glabra* is much grown in the Argentine as an ornamental tree, and in Central America, its place of origin, it is used in the manufacture of a popular medicine. It is very often catalogued under the name of *Aglaiia odorata*. This species, however, is not grown in Argentina, and the author here distinguishes between the two.

1938. MOLDENKE, H. N.

Verbenaceous novelties, mostly from Madagascar, and miscellaneous taxonomic notes. *Lloydia*, 1950, 13: 205-26.

Taxonomic notes are given on 1 species of *Callicarpa*, 26 species and subspecies of *Clerodendrum*, 3 species of *Lippia*, 1 of *Paepalanthus*, 1 of *Teijsmanniodendron* and 1 of *Verbena*.

1939. THÉE, J.

*Duranta plumieri* (Verbenacées). (*Duranta plumieri* (Verbenaceae).)

Rev. hort. Paris, 1950, 122: 296, bibl. 2, illus.

The author suggests that *Duranta plumieri*, an evergreen shrub with clusters of blue or white flowers and fleshy yellow fruits, should be more widely grown in the Mediterranean regions. It makes a good hedge, and can also be grown as a shrub or in pots. It is propagated easily from seeds or cuttings and is remarkably free from pests and diseases.

#### Lawns.

(See also 2140.)

1940. SMITH, F. G. AND SMYTH, V. D. O.

A method of levelling depressions in turf. *J. Bd greenkeep. Res.*, 1950, 7: 342-3, illus.

An illustrated description is given of the operation which involves placing fine soil under loose strips of turf without completely detaching them.

1941. HURCOMBE, R. E.

A cytological and morphological study of cultivated *Cynodon* species.

Better turf through research, 1948, pp. 36-47, bibl. 11, illus., being [Publ.] Afr. Expl. chem. Ind. and S. Afr. Turf Res. Fund [received 1951].

The following grasses were studied: *Cynodon bradleyi* Stent (Bradley Grass), *C. transvaalensis* Burt Davy (Florida Grass), *C. dactylon* Pers. (Coarse Kweek or Hard Kweek), *C. dactylon* Pers. var. *densus* var. nov. (Hall's Selection), *C. magennisii* sp. nov. (Magennis Grass), *C. dactylon* var. Royal Cape, *C. hirsutus* Stent, *C. plectostachyum* Pilg., *C. incompletus* Nees.

1942. MEREDITH, D., AND HURCOMBE, R. E.

Growth rate studies [on species and varieties of *Cynodon*].

Better turf through research, 1948, pp. 48-51 illus., being [Publ.] Afr. Expl. chem. Ind. and S. Afr. Turf Res. Fund [received 1951].

Individual strains in a variety trial with species and strains of *Cynodon* showed too much variation to

warrant detailed conclusions, but it seems clear that the finer *Cynodon* species such as Florida and Bradley, and others such as Waverley, Skaapplaas and Elliot, are quick growers, whereas the coarser types are slower growers.

1943. WEINBRENN, C.

Investigations into the germination of *Cynodon dactylon* seed.

Better turf through research, 1948, pp. 76-85, bibl. 6, being [Publ.] Afr. Expl. chem. Ind. and S. Afr. Turf Res. Fund [received 1951].

A high yield of mature and viable seed suggested the possibility of using seed instead of roots and stolons for surfacing aerodromes. Optimum conditions for germinating these seeds were found to be a sufficiency of moisture and a suitable alternation of temperature between 8°-12° C. and 35°-40° C. Seed sown in the shade with a slight day and night temperature variation germinated poorly. Various methods of stimulating germination were tried, of which stratification in compost followed by presoaking was the most effective. Scarification between sheets of emery paper also produced good results, while hormone and other stimulating treatments were found ineffective. These germination trials carried out in the laboratory proved a reliable guide to field behaviour.

1944. GILLILAND, H. B.

Experiments on the vegetative propagation of *Cynodon* species.

Better turf through research, 1948, pp. 86-90, bibl. 2, illus., being [Publ.] Afr. Expl. chem. Ind. and S. Afr. Turf Res. Fund [received 1951].

Portions of "runners" were rooted in sand in propagating boxes. The best rooting response was obtained in sand with particle size of the 40-50 mesh sieve range. When 6 different types of turf grass were rooted in sand of particle size 40 a remarkably uniform number of cuttings rooted, but the "coarser" grasses had a larger number of roots. A higher percentage of cuttings rooted when watered from below than from above. The use of indolebutyric acid did not improve the rooting percentage.

1945. WEINMANN, H., AND GOLDSMITH, E. P.

Underground reserves of *Cynodon dactylon*.

Better turf through research, 1948, pp. 56-75, bibl. 4, illus., being [Publ.] Afr. Expl. chem. Ind. and S. Afr. Turf Res. Fund [received 1951].

The investigations reported indicate that the grass is characterized by an extraordinarily well developed underground system, and exhibits a great resistance to close cutting and grazing. The amounts of organic matter in combined roots and rhizomes to a depth of 6½ in. ranged from 10 to 15 tons per acre for turf, and from 3 to 7 tons per acre for grazing land. The bulk of the carbohydrate underground reserve was found in the rhizomes, and the total available carbohydrate in combined roots and rhizomes, under turf conditions, ranged from 1,500 to 3,000 lb. per acre, and under grazing conditions from 700 to 1,600 lb. per acre. When *C. dactylon* is intensively cut or grazed, applications of NP fertilizers significantly increase the root and rhizome weight and the percentage of total available carbohydrate in the rhizomes.

1946. LE ROUX, M., AND WEINMANN, H.  
**Studies on the water relations of *Cynodon dactylon*.**  
*Better turf through research*, 1948, pp. 52-5,  
 bibl. 1, being [Publ.] *Afr. Expl. chem. Ind.*  
*and S. Afr. Turf Res. Fund* [received 1951].

The following studies are reported: osmotic pressure determinations on *Cynodon dactylon*, *Festuca elatior*, *Brachiaria humidicola* and *Digitaria eriantha*; growth response to variations in water supply of *Cynodon dactylon*; and water consumption at different levels of water supply by 6 strains of *C. dactylon* compared with *Agrostis tenuis*, *Festuca ovina* and *Poa pratensis*.

1947. HALL, T. D., AND OTHERS.

**The effect of fertilizers on turf grasses at the Frankenwald Botanical Research Station.**  
*Better turf through research*, 1948, pp. 1-16,  
 illus., being [Publ.] *Afr. Expl. chem. Ind.*  
*and S. Afr. Turf Res. Fund* [received 1951].

Plots planted with turf grasses, mainly types or strains of *Cynodon dactylon*, were studied in these trials. The grasses showed a marked response to applications of soluble nitrogenous fertilizers. Phosphate, in itself ineffective, appeared to be necessary for the maximum response to N. Lime, hitherto not considered to be important in turf maintenance, was found essential where sulphate of ammonia was used as the source of readily available N. It also appeared to be of value in enabling the grass to compete with various weeds, such as species of *Cyperus*. K has so far had no marked effect. Investigations on root and rhizome weights in one species showed that N treatments which markedly affected top growth also markedly affected root growth to a depth of 6 in.

1948. HALL, T. D., MEREDITH, D., AND MURRAY, S. M.

**Dry matter and protein of *Cynodon dactylon* as affected by amounts and forms of nitrogen applied.**

*Better turf through research*, 1948, pp. 29-35,  
 bibl. 5, illus., being [Publ.] *Afr. Expl. chem. Ind.*  
*and S. Afr. Turf Res. Fund* [received 1951].

In experiments with "kweek" (*Cynodon dactylon*), inorganic nitrogen treatments had a greater influence on both top growth and root weight than nitrogen in the form of compost. The effects of treatments, in general, were to increase dry matter production rather than crude protein content.

1949. BRADFORD, B., WHITEHEAD, G. B., AND ALTONA, R. E.

**A coccid pest of turf.**

Reprinted from *J. ent. Soc. S. Afr.*, 1949,  
 12: 134-6, illus.

A brief account of *Antonina indica* Green, a pest of turf in Natal.

#### Noted.

1950.

- a AGLIANY, J.

Les plantations d'alignement dans la région méditerranéenne. ([Evergreen] trees suitable for planting in avenues in the Mediterranean region.)  
*Rev. hort. Paris*, 1950, 122: 275-8, illus.

- b BEDBROOK, C.  
**Bulbous irises, *Reticulata* section.**  
*J. roy. hort. Soc.*, 1951, 76: 89-91, illus.  
 Notes on 7 species found in commerce.
- c DILATUSH, T. J.  
**Selecting parent stock of holly.**  
*Amer. Nurserym.*, 1950, 92: 10: 16-17.
- d FRASER, G. K.  
**Peat and its uses in horticulture.**  
*J. Bd greenkeep. Res.*, 1950, 7: 322-34.
- e GAISER, L. O.  
**Asynapsis and triploidy in a population of *Liatris ligulistylis*.**  
*Lloydia*, 1950, 13: 229-42, bibl. 12, illus.
- f GRAFL, I.  
**Pétunia "Balcon bernois". (The new petunia variety Balcon bernois.)**  
*Rev. hort. suisse*, 1951, 54: 18-20, illus.
- g HAYASHI, K.  
**Anthocyanin pigment from the red flower of *Hibiscus rosa-sinensis* L. (Preliminary report.)** [Japanese, English summary.]  
*Bot. Mag. Tokyo*, 1941, 55: 417-22, from abstr. in *Jap. J. Bot.*, 1942, 12: (3) [received 1950].
- h HAYASHI, K.  
**On the anthocyanins from the fruit of *Ligustrum japonicum* Thunb. (Preliminary report.)** [Japanese, English summary.]  
*Bot. Mag. Tokyo*, 1941, 55: 423-8, from abstr. in *Jap. J. Bot.*, 1942, 12: (3) [received 1950].
- i HINO, I., AND INOUE, Y.  
**Virus disease of ferns.** [Japanese, English summary.]  
*Ann. phytopath. Soc. Japan*, 1941, 11: 1-6, illus., from abstr. in *Jap. J. Bot.*, 1942, 12: (4) [received 1950].
- j KARASAWA, K.  
**Karyological studies in *Crocus* II.**  
*Jap. J. Bot.*, 1940, 11: 129-40, bibl. 6, illus. [received 1950].
- k OGG, S.  
**Dahlias and their cultivation.**  
*J. roy. hort. Soc.*, 1951, 76: 80-5, illus.  
 Including notes on propagation.
- l RASMUSSEN, A. O., KIRBY, R. S., AND PEPPER, J. O.  
**Hybrid delphinium.**  
**Gladiolus.**  
**Peonies.**  
**Hardy chrysanthemums.**  
**Dahlias.**  
*Leaflets Pa agric. Ext. Serv.* 137 to 141, 1950,  
 pp. 4 each, illus.  
 Brief cultural notes for growers.
- m SHEWELL-COOPER, W. E.  
**Forcing hydrangeas for the spring.**  
*Fruitgrower*, 1950, No. 2866, p. 662.



## SUB-TROPICAL FRUIT AND PLANTATION CROPS.

*General.*

(See also 2007, 2130, 2142.)

1951. FENTON, F., AND OTHERS.  
Home freezing in Hawaii.  
*Circ. Hawaii agric. Exp. Stat.* 33, 1950,  
pp. 62.

Among horticultural crops for which methods are described are avocado, banana, blackberry, carambola, coconut, guava, mango, mulberry, passion fruit, pineapple, plum, soursop, strawberry, Surinam cherry and a few vegetables.

*Avocados.*

(See also 2179.)

1952. LUCIE-SMITH, M. N.  
Some notes on the avocado.  
*Proc. agric. Soc. Trin. Tob.*, 1950, 50:  
201-8.

Notes are given on the races of avocados, the varieties introduced to, or selected in, Trinidad, pollination, propagation, wind protection, soils, management, pests and diseases and the prospects for extended planting. Prospects for developing an export trade are doubtful, but there is room for expansion in the local market, and for this purpose the varieties recommended are Pollock (early), Rudder and St. Clair (early mid-season), Collinson (late mid-season) and Lula (late). For propagation by budding the best results are obtained with stocks that are only about 6 weeks old, when these are budded at the beginning of the dry season. For topworking, crown grafting with a ring of scions has proved satisfactory. Among diseases the most serious is avocado tree decline, a physiological disorder caused by poor soil drainage; a phytophthora rot may sometimes be associated with this disorder.

*Citrus.*

(See also 1252, 1273, 1376, 1399c, 1450, 1493, 1894, 2003a, b, c, d, e, f, g, 2004, 2142, 2145, 2150, 2152, 2153, 2164, 2173, 2174, 2179.)

1953. GIORDANO, B.  
Agrumicoltura calabrese. (Citrus-growing in Calabria.)  
*Humus*, 1950, 6: 10: 18-21, illus.

An account of citrus-growing in Calabria (southern Italy). The areas (in hectares) under oranges, mandarins, lemons, citrons, bergamots, and limes are tabulated with yields. Notes are given on citrus-growing districts, and on manuring, windbreaks, the possibility of extending citrus cultivation, and on pests and diseases.

1954. SINGH, T. C. N., AND SHAH, R.  
The chromosome counts of *Citrus suntara*.  
*Curr. Sci.*, 1950, 19: 385, bibl. 1, illus.

*Citrus suntara*, an important commercial loose-skinned orange known in the Central Provinces as "Nagpur santra", has consistently shown a chromosome count of  $n=9$  and thus falls in line with other citrus species already recorded.

1955. ČAĽLAHJAN, M. H., AND NEKRASOVA, T. V.  
The effect of taking cuttings on the activity of the developing buds in lemon seedlings.  
[Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1950, 70:  
723-5, bibl. 6, illus.

Experiments indicate that the activity of the developing buds and the formation of shoots are markedly higher in seedling-cuttings (treated with heteroauxin) than in seedlings themselves, and this is associated with the increased growth and activity of the roots of the seedling-cuttings. The author discusses this in relation to hastening the initiation of fruiting.

1956. LUCIE-SMITH, M. N.  
The citrus rootstock problem in Trinidad.  
*Proc. agric. Soc. Trin. Tob.*, 1950, 50: 327-34.

The virus disease affecting sweet orange worked on sour orange rootstocks does not occur in Trinidad, but its presence nearby on the mainland and the widespread occurrence of the aphid vector make the risk of infection serious. Alternative rootstocks are discussed, and experiments to determine their suitability are in progress, but up to the present growers have the choice of continuing to use the sour orange or changing to some other stock of unknown performance.

1957. FAHEY, H. N.  
Problems of the citrus planter.  
*Proc. agric. Soc. Trin. Tob.*, 1950, 50:  
259-65.

The author, formerly a large grower of limes, outlines the history of this crop in Trinidad, and describes its various set-backs due to economic factors, wither-tip disease and more recently to dying out in a manner very similar to that seen in the virus quick decline of other citrus varieties. If the use of the wild grapefruit of Dominica as a rootstock fails to solve this last problem, it will be necessary in future to look on limes as a catch crop, limiting planting to areas of low rainfall where wither-tip attacks are known to be light.

1958. ANON.  
Injertos y portainjertos. (Citrus varieties and rootstocks.)  
*Idia*, 1950, 3: 33/34: 40-3, illus.

Recommendations made by the Citrus Commission in Tucuman concerning desirable combinations of citrus varieties and rootstocks are listed, and the principal characteristics of 4 rootstocks (sweet orange, Rangpur lime, rough lemon and trifoliata), including their susceptibility to diseases, are tabulated.

1959. BANIF, A.  
Ensayo comparativo de portainjertos para citrus. (Comparative trials with citrus rootstocks.)  
*Idia*, 1950, 3: 33/34: 44-6, illus.

A preliminary report is given of trials carried out at the Colonia Yeruá Substation, Argentina, to study the behaviour of 9 citrus rootstocks budded with Valencia Late orange and the common mandarin of Concordia. The rootstocks used were sour orange, sweet orange variety China, trifoliata, common mandarin, rough lemon, California grapefruit, Rangpur lime, Persian sweet lime and common acid lime. The stocks were

budded in 1941. So far the development of both mandarin and orange has been most satisfactory on Rangpur lime, sweet orange and rough lemon. The productivity of mandarins was greatest on mandarin, rough lemon and Rangpur lime. This last stock produced 30% of fruits in grades 0, 1a and 2a, as compared with 18% produced by trees on rough lemon, while trifoliata produced 60% of fruits in grades 3a, 4a and 5a. Trees on sour orange stock were killed by tristeza, and the disease was also noticed on trees on grapefruit. Xyloporosis occurred on trees on Persian and acid lime. Gummosis only occurred on 2 trees on rough lemon, and the plants recovered rapidly. Results of chemical analyses of the fruits harvested in these trials are tabulated. Two further experiments are being carried out at the same station with a number of late orange, mandarin and grapefruit varieties worked on 5 different stocks.

1960. BITTERS, W. P., AND BATCHELOR, L. D.

**Rootstocks affect orange sizes.**

*Calif. Citrogr.*, 1951, 36: 92.

Comparisons were made, on the basis of three-season averages, between the size and number of fruit of Washington Navel and Valencia oranges grown on 32 different rootstocks. Comparisons between the size of the trees on the different rootstocks were made in the second season. In the case of Washington Navel, sour orange stocks gave the largest fruit, while with Valencias the trifoliata orange was outstanding in this respect. In many instances the fruit size was inversely correlated with the number of fruits per tree. Valencias on trifoliata orange stocks gave a large number of fruit, taking into consideration the size of the tree. There were big seasonal variations.

C.W.S.H.

1961. MEITH, H. C.

**Alternate middle irrigation.**

*Calif. Citrogr.*, 1951, 36: 94.

Under the "alternate middle" irrigation system water is admitted to alternate avenues between citrus trees at 15-day intervals, instead of the whole orchard being irrigated every 21 days. It is claimed that the system is particularly useful in old orchards which are very susceptible to over-watering, since one half of the root system can dry out at regular intervals, while the trees are obtaining an adequate supply from the other half. In this way wilting is avoided, and irrigation water is conserved.

C.W.S.H.

1962. SPURLING, M. B.

**Water requirements of citrus. Part III.**

**Citrus leaf drop.**

*J. Dep. Agric. S. Aust.*, 1950, 54: 190-4, illus.

1. The primary cause of citrus leaf drop is severe moisture stress. 2. Fruit on the tree and the deep ramified roots of trees on deep soils act as a buffer during severe moisture stress. 3. The critical period for initiation of a severe leaf drop is in September and October when the production of new leaf growth and blossoms greatly increases the liability of a drop of old leaves. 4. The completion of navel harvest in August lengthens the critical period for this variety. [Author's summary.]

1963. LEUTY, J. D.

**Lemon root growth study.**

*Calif. Citrogr.*, 1951, 36: 131.

A study was made of the effect of soil temperature and irrigation on the root growth of the lemon in sandy and in heavy soils. In both soils growth started in April at 59° F. Roots stopped growing in light soil at 67° F., in heavy soil at 57° F. With irrigation, root activity started 8 to 20 days after application. Root activity cycles lasted from 56 to 77 days but actual growth activity was from 15 to 36 days.

C.W.S.H.

1964. ELLIS, T. O., AND TAI, E. A.

**Report on citrus orchard analyses 1947-48.**

*Bull. Dep. Agric. Jamaica* 39, 1949, pp. 50, bibl. 5, map, 1s. 3d. [received 1951].

A survey embracing all grapefruit and orange groves of over 5 acres was carried out throughout Jamaica between October 1947 and February 1948. All orchards were visited and rated by observations as regards their location, management and performance. A total of 262 leaf samples representing nearly 4,500 acres were analysed for N, P, K, Ca and Mg, and the results of these analyses are tabulated in detail. In most cases the nutrient status of the trees, as indicated by foliar analysis, corresponded to the known mineral status of the various well-defined soil types on which the trees were growing. The survey indicated that on the whole the nutrient status of citrus in Jamaica was poor and that inadequate attention was paid to soil conservation, regulation of soil moisture, fertilizer treatments, cover cropping and weed control. It is hoped that the findings of the survey will form a basis for planned fertilizer treatments in all the established citrus-growing districts.

1965. JONES, W. W., AND PARKER, E. R.

**Washington Navel orange juice.**

*Calif. Citrogr.*, 1951, 36: 113-14.

In two experiments determinations have been made to find the effect of fertilizers and cover crops on the juice percentage of Washington Navel oranges and on the acidity and composition of the juice. In the presence of N, both phosphates and cover crops increased the juice percentage, while the elimination of N caused a big increase of juice. Potash had no effect. Acidity was increased by N but decreased by  $P_2O_5$ . Cover cropping reduced the N and K in the juice. The quantity of N, P and K in the juice was increased by N, P and K fertilizers.

C.W.S.H.

1966. PENNISI, L.

Sulla presunta influenza della concimazione e dell'esposizione delle piante sul contenuto in vitamina C, acidi e solidi totali, in rapporto al grado di maturazione delle arance. (On the supposed influence of manuring and insolation of plants upon the vitamin C, acid and total solids content, in relation to the degree of maturity of oranges.) [English summary  $\frac{1}{2}$  p.]

*Ann. Sper. agrar.*, 1950, 4: 969-74, bibl. 8.

Manuring and insolation affect only very slightly the vitamin C, acid and total solid content in the juice of the Sanguinello orange in relation to the degree of maturity of the fruits.



1967. ALDRICH, D. G., AND COONY, J. J.

A response of lemon trees to phosphate fertilization.

*Calif. Citrogr.*, 1951, 36: 93, 122-5, bibl. 6, illus.

Lemon trees with a characteristic leaf spot had previously responded to trunk injections of phosphorus and potassium. Trials were designed to determine whether this was due to P alone or to P and K. The experiments, with treatments N, NK, NP and NPK, were laid down at four centres. The phosphate applications were followed by marked improvement in the leaves and a big increase in yield of fruit, and recently matured leaves showed a significant increase in P content. The K content, which was not increased by manuring, appeared to be adequate. The results showed that the composition of recently matured leaves gave a much better indication of nutrient status than did the older leaves with spots. K fertilization reduced yields, and from leaf analyses it appeared that this was due to the fact that the addition of K had reduced the Mg and P content of the leaves. The phosphate deficiency symptoms of lemons have not been found on oranges growing nearby, and phosphate fertilizers had no effect on growth or leaf composition of the latter. C.W.S.H.

1968. TRUMBLE, H. P. C.

Zinc sprays for citrus mottle leaf control.

Zinc oxide not now recommended.

*J. Dep. Agric. S. Aust.*, 1950, 54: 236-7, bibl. 2.

Zinc oxide, previously a reliable and convenient spray material for the cure of mottle leaf in citrus, has been found to be the cause of certain cases of severe leaf drop. Until the position has been fully investigated growers are advised not to use zinc oxide in citrus spraying. A zinc sulphate-lime spray (commercial zinc sulphate 5 lb., Limil 2½ lb., water 100 gal.) is recommended instead.

1969. FRITH, H. J.

The reduction of drop of Washington Navel oranges by 2,4-dichlorophenoxyacetic acid.

*J. Aust. Inst. agric. Sci.*, 1950, 16: 101-4, bibl. 3.

Sprays of 4, 12, 16, 36 and 64 p.p.m. 2,4-D, applied in April or June, were equally effective in preventing fruit drop in July and August. The higher concentrations were least satisfactory, and sprays with 36 p.p.m. and over produced abnormally large and thick-skinned fruit. These concentrations also produced a buckling of mature leaves which persisted for 7 weeks. A concentration of 16 p.p.m. reduced the drop by 40%, had no effect on fruit quality and had only a very temporary effect on the leaves. 2,4-D was successfully applied mixed with a white oil-bordeaux solution used for red scale and black spot control. C.W.S.H.

1970. ERICKSON, L. C., AND BRANNAMAN B. L.  
2,4-D for preharvest drop of Washington Navel oranges.

*Calif. Citrogr.*, 1950, 36: 47, 59-62, bibl. 7.

The pre-harvest drop consists of 5% to 25% sound fruit, the remainder being culls. Some of the culls

are split fruit, and 2,4-D spraying for increasing fruit size was found to reduce splitting by 30%. When pre-harvest drop of sound fruit is heavy, 2,4-D spraying may give effective control, either incorporated in a summer oil pest control spray at 4 p.p.m., or as a winter spray at 8 p.p.m. A winter spray experiment showed that spraying in December or January was most effective; if delayed, some loss of sound fruit occurs before treatment, and there is no point in waiting till after the frost danger is over. Where pre-harvest drop is only small there is no advantage in spraying, particularly as some culls may not fall as a result. These 2,4-D sprays may also be combined with bordeaux sprays and minor element sprays. C.W.S.H.

1971. LIVINGSTON, G. A.

*In vitro* tests of abscission agents.

*Plant Physiol.*, 1950, 25: 711-21, bibl. 13, illus.

Abscission in the excised laminar abscission layer of the Valencia orange was studied. Experiments were conducted with explants to determine the effects of: various fractions of blade tissue, immersion in distilled water, sucrose, chloral hydrate, indoleacetic acid, 2,4-dichlorophenoxyacetic acid, ethylene and cyanamid. Ethylene accelerated abscission, all other treatments inhibited abscission. Many of the treatments brought about enlargement of the tissues proximal to the abscission groove. It is suggested that this may have been the result of interference with free movement of materials by the heavily suberized cells which form a layer surrounding the vascular tissues in the inner cortex and another just distal to the abscission zone in the cortical tissues. This investigation has demonstrated the value of studying abscission in the laboratory using excised tissues of relatively small volume. This method is convenient and the results are comparable to those obtained in the field. [Author's summary.]—University of California, Los Angeles.

1972. MIRIMANJAN, V. A.

The biological peculiarities of lemon and mandarin in relation to their different frost resistance. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 74: 1029-32, bibl. 9.

This article is an analytical study of the carbohydrate and water content and photosynthetic activity in lemon and mandarin leaves throughout the year. It is concluded that differences in frost resistance are due to the biological properties of the protoplasm.

1973. ELJGORT, S. G., AND LADARIJA, Z. N.

The changes in the permeability of the protoplasm of citrus tissues during frost. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 70: 913-16, bibl. 6.

This is a study of the changes in the relative permeability of the protoplasm of citrus tissues (leaves and shoots of lemon, mandarin and orange) at low temperatures, as determined by the electrical conductivity of the tissue extracts. It is concluded that the method can be used for determining accurately and quickly the relative winter hardiness of subtropical plants.

1974. FERNANDEZ VALIELA, M. V.

Informe preliminar acerca de la etiología de la "podredumbre de las raicillas" del naranjo agrio injertado. (A preliminary report on the etiology of "root-rot" of grafted sour orange.)

Rev. Invest. agric. B. Aires, 1948, 2: 139-46, bibl. in text, illus. [received 1951].

The results of preliminary trials carried out at the Phytopathological Laboratory, Delta, in which sweet orange scions from diseased trees were budded on to sour orange stocks and on to double stocks of sour and sweet orange and in which the disease was successfully transmitted by the aphid *Paratoxoptera argentinensis*, indicated that the disease was of a virus nature and affected the conducting tissues. The incubation period varied from 70 to 90 days.

1975. TURICA, A.

*Paratoxoptera argentinensis* (Blanchard). (The aphid vector of tristeza disease of citrus.)

Idia, 1950, 3: 33/34: 29-30, illus.

Notes on the distribution and biology of *Paratoxoptera argentinensis* [*Aphis citricidus*], the insect vector of the tristeza virus, are followed by an account of trials carried out at the Phytopathological Laboratory, Delta, on the infective capacity of the insect. A trial to determine whether the citrus whitefly, *Aleurothrixus howardi*, was also a vector gave negative results. Infection can best be prevented by controlling the aphid. Treatment is most effective at the end of summer, and the following insecticides have given good control: 0.15% nicotine sulphate, 50% DDT dust or wettable powder, 10% Gammexane and 2% E605 used as a spray.

1976. ZABALA, S.

Limoneros probablemente afectados por la "podredumbre de las raicillas". (A probable case of root-rot infection in lemons.)

Idia, 1950, 3: 33/34: 26.

Lemons on sour orange stock have hitherto been considered highly resistant or immune to the root-rot [tristeza] virus. Typical leaf and shoot symptoms of the virus, however, were observed in a plantation of lemons, variety Génova, on sour orange in the province of Salta, Argentina. Root symptoms were only present in a few cases and were not severe. It has not been definitely proved that the trouble was due to root-rot infection.

1977. CONDADO, C.

"Xyloporosis" en Bella Vista, Corrientes. (Xyloporosis in Bella Vista, Corrientes [Argentina].)

Idia, 1950, 3: 33/34: 47-50, bibl. 8, illus.

In 1947 many plantations in Corrientes of a late orange, known locally as "Redonda de Jalim", on Persian sweet lime stock were observed to be suffering from a disorder thought to be due to incompatibility. In 1949 the trouble was identified and the causes discussed with reference to the literature. As a case of xyloporosis has been observed locally on an ungrafted Persian lime, it is considered improbable that the trouble is due to incompatibility. A study of the occurrence of the disease in Bella Vista on various combinations of stock and scion showed that, although

it occurred in many combinations, late orange varieties on Persian lime stock were particularly susceptible, and growers are warned against the extensive use of this stock. Experiments are being carried out in control by inarching, re-heading, and applying a complete fertilizer. This last measure has given very promising results.

1978. LOEST, F. C.

Orchard practices in relation to "collar rot" of citrus.

Fmg S. Afr., 1950, 25: 331-3, 340, illus.

In the Transvaal, where brown rot gummosis (*Phytophthora citrophthora*) is not a problem, drastic treatment of the lesions is not required. In the eastern Cape Province and Natal, however, where dry root rot (*Diplodia natalensis*) and brown rot gummosis often occur on the same tree, the application of tree surgery to crown roots and trunk is recommended in all cases. The wounds and the whole trunk should subsequently be painted with a good fungicide. The use of resistant trees is to be preferred to trunk surgery as a means of controlling *Diplodia* gummosis.

1979. SPERONI, H. A.

"La podredumbre morena de las mandarinas." (Brown rot of mandarins.)

Idia, 1950, 3: 33/34: 37-8, bibl. 10, illus.

Brown rot of citrus is prevalent in all the coastal areas of Argentina, the degree of infection depending on weather conditions. Experiments have shown that the causal fungus is *Phytophthora citrophthora*. The artificial culture of the fungus is described and control measures suggested. It has been observed that infection is much less severe in well-managed plantations where adequate fertilizer treatment is given and where the trees are sprayed with bordeaux mixture or other copper sprays for the control of scab and melanose. In rainy districts trees should be grown on a high stem to prevent the zoospores being splashed onto the leaves from the soil. Fruit should never be picked wet. The author has found the following treatment to be very effective: after picking off and burning all infected fruit, spray the trees and the soil under them with a 1-0.5-100 bordeaux spray. A single application is usually sufficient.

1980. FRASER, L.

A gummosis disease of citrus in relation to its environment.

Reprinted from Proc. Linnean Soc. N.S.W., 1949, 74, pp. v-xviii, bibl. 22, as Contr. biol.

Br. Dep. Agric. N.S.W. 353.

Gummosis disease of citrus is described under cause (*Phytophthora citrophthora*), history, influence of environment (soil reaction, temperature), variation in susceptibility, and spread of disease. A classification of species with regard to susceptibility is given as: very susceptible, lemon, sweet lime; moderately susceptible, sweet orange, rough lemon, grapefruit; fairly resistant, Sampson tangelo, Thornton tangelo, sour orange; resistant, Citremon; immune, Carrezo citrange, *Poncirus trifoliata*.

1981. KLOTZ, L. J.

Report on mal secco disease.

Calif. Citrogr., 1950, 36: 74-5.

Mal secco disease (*Deuterophoma*) of lemon trees is



common in Italy and Sicily. Sour orange rootstocks, which are commonly used, are susceptible. The Monachello lemon variety is fairly resistant, but the Feminello is very susceptible and large numbers of trees have been killed. Resistant mutants are under observation, and tetraploid lemons are being used for crossing. In orchard practice infected twigs are pruned off as soon as they are noticed. C.W.S.H.

1982. STEPANOV, K. M.

**The sources of infection of the mal secco disease of lemon trees.** [Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1950, 15: 8: 39-44, illus.

To check the distribution of the mal secco disease (*Deuterophoma tracheiphila*) of lemon trees, the removal of sources of infection by systematic sanitary measures is of primary importance. This involves cutting out diseased branches and disinfecting the cut surfaces, the immediate and careful removal and destruction of all infected parts, followed by the application of bordeaux mixture to the affected and neighbouring trees.

1983. YAMAMOTO, W.

**A black brown sooty mould of citrus trees.**

I and II. [Japanese, English summary.]

*J. Soc. trop. Agric. Japan*, 1941, 13: 119-25, 213-21, from abstr. in *Jap. J. Bot.*, 1942, 12: (31) [received 1950].

A sooty mould which is common on the leaves, fruit and shoots of citrus trees in Formosa is associated with the presence of scale insects or the larvae of white flies. The fungus has been found on 36 species belonging to 16 families, and is associated with the presence of 21 species of insects.

1984. ŠNEIDER, JU. I.

**When to spray citrus to control bacterial necrosis.** [Russian.]

*Sad i Ogorod* (Orchard and garden), 1950, No. 11, pp. 43-5.

For the control of citrus bacteriosis [*Pseudomonas syringae*] on mandarins in Adžan (Adzhan, Georgian S.S.R.) the author, from the results of experiments described, advocates late (November-December) and early spring (middle of February to beginning of March) spraying with 1% bordeaux mixture combined with cutting out all infected shoots.

1985. DU CHARME, E. P.

**La causa de la cancrrosis del limón. (The cause of cancrrosis of lemons.)**

*Idia*, 1950, 3: 33/34: 27-8, illus.

Inoculation tests with yellow gram-negative bacteria isolated from cancrrosis lesions on the fruit and leaves of lemon have given positive results. The organism has not yet been identified. The degree of susceptibility shown by the host species is different from that shown by the hosts of *Xanthomonas citri*, the causal agent of citrus canker. Lemons are most highly susceptible to cancrrosis, while the Persian sweet lime is less so, and sweet and sour oranges are only slightly susceptible. The disease has not been observed in grapefruit or trifoliate orange. Destruction of infected fruit and hard pruning are recommended for control. Spraying with copper when the fruit is small is suggested provisionally.

1986. RATKOVICH, M.

**Los insectos entomófagos relacionados con la citricultura tucumana. (Entomophagous insects of importance to citrus culture in Tucumán.)**

*Idia*, 1950, 3: 33/34: 23-6, bibl. 16.

The possibility of extensive biological control of citrus pests in Tucumán is discussed, the work that has already been done by the Tucuman Agricultural Experimental Station on the control of mealybug (*Icerya purchasi*) and fruit fly (*Anastrepha* spp.) being mentioned. The establishment of an insectary for the study and breeding of predators on a large scale is urged. A list is appended of all the entomophagous insects of importance to citrus culture that have been found in Tucumán.

1987. YUST, H. R.

**Orlon tent for citrus fumigation with hydrocyanic acid.**

*J. econ. Ent.*, 1950, 43: 569, bibl. 1.

A note on the characteristics of Orlon, the trade name for a new synthetic fibre that is superior to nylon in its resistance to sunlight and high temperatures.

1988. SMIT, B.

**The Australian bug.**

*Fmg S. Afr.*, 1951, 26: 19, 24.

The relation between incidence of the Australian citrus bug, *Icerya purchasi*, and its control by the predator, the Vedalia ladybird beetle, *Rodolia cardinalis*, is discussed. For the present the Division of Entomology, Pretoria, is discouraging the use of the new organic insecticides for the control of the Australian bug and is relying on the Vedalia beetle.

1989. MINATTA, M. J.

**"Mosca de las frutas", *Ceratitis capitata* (Wiedmann). Su biología y control. (Biology and control of the fruit fly, *Ceratitis capitata*.)**

*Idia*, 1950, 3: 33/34: 32-3.

The data obtained in a study of the biology of the citrus pest *Ceratitis capitata*, carried out at the Concordia Experimental Station, are presented, and the relative value of various methods of control is discussed.

1990. JEPSON, L. R., JESSER, M. J., AND COMPLIN, J. O.

**Field studies in control of mites injurious to citrus.**

*Calif. Citrogr.*, 1950, 36: 50, 68-72.

A number of new compounds are being tried for the control of citrus mites. Aramite has proved effective as a dust or spray, at 15 to 40 lb. of 15% wettable powder per acre. Compound K-6451 has also been successful, particularly against mite eggs, though less so against adults; it has, however, been ineffective in controlling the citrus bud mite. Compound R-242 was not satisfactory in winter and spring sprayings. The organic phosphate EPN-300 was successful against red mite, but less so against bud mite. Compound DN-211 has shown promise against the bud mite but not against other mites except when combined with other acaricides. C.W.S.H.

1991. MINATTA, M. J.

*Cochinilla roja australiana Aonidiella aurantii* (Maskell), su biología y control. (Biology and control of the Australian red scale.) *Idia*, 1950, 3: 33/34: 31-2.

The red scale was introduced into Entre Rios, Argentina, in 1928 and is now one of the most serious pests of citrus in the district. A study of its biology has shown that the reproduction period lasts from early spring till the beginning of winter, with peaks of activity in September/October and January/February. There are 4 generations a year, two in spring/summer lasting 49-56 days, one in autumn lasting 72-96 days, and one in winter/spring lasting 167 days. Females produce from 19 to 132 larvae each over a period of 14 to 104 days. For control of the pest it is recommended that dusts [unspecified] should be applied during the month following petal-fall (about 25 October-25 November) and from 15 January to 15 February. Dusts should not be applied during flowering, during periods of drought, or at temperatures above 32° C.

1992. EVERETT, P.

Control of soft wax scale on citrus trees. *N.Z. J. Agric.*, 1950, 81: 344.

From tests on the control of *Ceroplastes destructor* the following recommendations are made: (1) To permit complete spray coverage, lightly prune all citrus trees with dense foliage. (2) Spray all infested and adjacent citrus trees with 3% summer oil emulsion.

1993. DOMATO, J.

Determinación del mejor momento para la cosecha y comercialización de los frutos cítricos. (Determination of the best time for harvesting and marketing citrus fruits. *Idia*, 1950, 3: 33/34: 39.

It has been found that citrus fruit is at the optimum stage of maturity for picking when the acid/sugar ratio is 1:7. In practice, however, it is difficult to conform to this standard, as the fruit does not all mature at the same time. Figures obtained at the Tucumán Experimental Station with Lue Gim Gong oranges show that the fruit in the interior of the tree ripens later than that on the periphery, and that the rootstock exerts a considerable influence on the acid/sugar ratio. It is suggested that this ratio should be used as a criterion for the market value of citrus fruit.

1994. WINSTON, J. R.

Harvesting and handling citrus fruits in the gulf states. *Fmrs' Bull. U.S. Dep. Agric.* 1763, 1950 (revised), pp. 67, illus.

This revised bulletin, compared with its predecessor published in 1937 [see *H.A.*, 7: 725], contains a more detailed account of packing house operations, better illustrations, and additional information on canning and processing and on physiological disorders (ageing, watery breakdown and freezing injury). Production figures for the last 30 years are supplied.

1995. COOPERATIVE RESEARCH AND SERVICE DIVISION, FARM CREDIT ADMINISTRATION, U.S. DEPARTMENT OF AGRICULTURE. Factors affecting costs of packing oranges. *Calif. Citrogr.*, 1951, 36: 90-1, 104.

Packing costs for 31 southern California Citrus Associations were analysed. Important factors affecting costs were volume, changes in volume, investment in fixed assets, age of buildings and equipment (to which depreciation charges were directly related), size and quality of fruit. Costs, and in particular administrative charges, were higher in the smaller volume plants. The use of pre-coolers raised costs, but allowed a more even flow of fruit through the packing house. Other factors affecting costs were variety, wrapping, wage rates, size of boxes and number of growers in the association. C.W.S.H.

1996. ARCHIOVSKAJA, E. V., AND RUBIN, B. A. The significance of gaseous exchange in citrus. [Russian.] *Doklady Akad. Nauk S.S.S.R.*, 1950, 71: 517-19, bibl. 3.

A study of respiration, in relation to temperature, of ripening lemons and oranges.

1997. HOPKINS, E. F., AND LOUCKS, K. W. Prevention of the phytotoxic action of sodium orthophenylphenate on citrus fruits by hexamine.

*Science*, 1950, 112: 720-1, bibl. 3, illus.

Solutions of Dovicide A (sodium orthophenylphenate) used as dip treatments are efficient in preventing decay of stored citrus fruits by stem-end rot and mould, but are liable, at effective concentrations, to cause severe burning of the peel. Trials with oranges dipped for 2 min. at 100° F. have shown that hexamine (hexamethylene-tetramine), added at 1% to a 2% Dovicide A solution, prevents peel injury without interfering with fungicidal action. Additions of many other materials, including formaldehyde, to Dovicide A solutions were either totally ineffective in preventing burn or at best reduced the injury under some conditions but not others.—Florida Citrus Exp. Stat., Lake Alfred.

#### Dates.

1998. BOMHARD, M. L.

Palm trees in the United States.

*Agric. Inf. Bull. U.S. Dep. Agric. For. Serv.* 22, 1950, pp. 26, bibl. 15, illus.

Fourteen species of palm, belonging to 9 genera, are native to the United States; in addition, 2 Old World palms, the coconut and the date, have become naturalized. The usefulness, distribution and general characteristics of the palm family as a whole are discussed, and further detailed notes are given on the Washingtonia palms, Palmettos, Royal palms, Coconut palms, Date palms, 5 Floridian tree species, and 3 fan-leaved species that may become trees.

1999. BLISS, D. E., AND OTHERS.

Second report on date-bunch covers and their relation to the fruit-spoilage complex of Deglet Noor dates.\*

Reprinted from *Rep. 27th annu. Date Grs' Inst.*, Coachella, 1950, pp. 7-12, as *Pap. Calif. Citrus Exp. Stat.* 646, pp. 13, bibl. 6.

The date-bunch covers used in the experiments described were made of processed paper or of tobacco cloth. The virtual absence of rain on the experimental plots during the latter part of 1949 resulted in a low incidence of tearing due to water injury. Checking

\* For abstract of the first report, see *H.A.*, 20: 1939.



and blacknose, however, were relatively severe. Fruit quality was improved in all treatments by using a combination of wire ventilating rings, Thiomate "19", and bunch covers. Fungus spoilage was decreased by the use of wire rings and Thiomate "19" but was increased by the use of paper covers alone. No significance was attached to any of the treatments in controlling insect infestation, except that there was a positive correlation between the incidence of fungus spoilage and infestation by the nitidulid beetles.

2000. VINCENT, L. E., AND LINDGREN, D. L.  
Progress report on control of date insects and the date mite.

Reprinted from *Rep 27th annu. Date Grs' Inst.*, Coachella, 1950, pp. 3-7, as *Pap. Calif. Citrus Exp. Stat.* 645, 1950, pp. 9, bibl. 5.

An account is given of trials with the following insecticides for the control of nitidulid beetles (*Carpophilus dimidiatus*, *C. hemipterus*, *Urophorus humeralis* and *Haptoncus luteolus*) infesting dates: 1% and 2.5% dieldrin, 2% lindane, 2% parathion, 1% parathion +1% dieldrin mixture and 1% lindane +1% dieldrin mixture, all of which proved to be toxic to the beetles. Both parathion and dieldrin appear very promising. Several new acaricides were tested against the date mite (*Paratetranychus simplex*), but sulphur continues to be the most effective and cheapest method of control when properly applied.

2001. STICKNEY, F. S., BARNES, D. F., AND SIMMONS, P.

Date palm insects in the United States.

*Circ. U.S. Dep. Agric.* 846, 1950, pp. 57, bibl. 68, illus.

Eleven major and 11 minor pests of date palms and date fruit are described, and the control of insects on dates in storage by fumigation and by low temperatures is outlined.

### Tung.

(See also 2176.)

2002. WEBSTER, C. C., WIEHE, P. O., AND SMEE, C.  
*The cultivation of the tung oil tree (Aleurites montana) in Nyasaland. (A practical guide for growers).*

Govt Printer, Zomba, 1950, pp. 48, illus., 5s.

This is a full account of the cultivation of *Aleurites montana* in Nyasaland. *A. fordii* gives a much lower yield and is not now cultivated to any extent. The crop is suitable for land above 2,000 ft. with a rainfall above 40 inches during the growing season. Up to 1940 nearly all plantations consisted of seedlings, but as between 40% and 54% of the trees are predominantly male the vegetative propagation of predominantly female trees is obviously desirable, and great progress has been made in this direction during the past 10 years. About 5% of male trees are now included in a plantation, though as few as 2% may be all that is required. Propagation is by budding on one-year-old seedlings, either in nurseries or, where catch cropping is practised, in the field. Multiplication nurseries for budwood are being established and the testing of clones is in progress. Neither budding nor the transfer of budded stumps to the field is difficult. Clones have been found to be of two types. Trees of type "A" are tall, those of

type "B" short and bushy. The former can be spaced at 35 ft. and the plantation can be intercropped in the first few years. The latter are spaced at 30 ft. In some areas windbreaks are required; *Eucalyptus* species, *Grevillea robusta* or *Pinus patula* are suitable, while *Tephrosia* species or *Cajanus indicus* can be used as windbreaks for young trees. The best system of cultivation consists of intercropping, under proper control, during the first few years, followed by the establishment of a perennial leguminous cover. The latter must not be so thick that it conceals the fallen fruit. Manurial requirements are not yet known, though there are indications that N is usually required. A nutritional disorder is corrected by application of zinc sulphate. A budded plantation should yield about a ton of hulled seed per acre at 10 years old. A short account is given of the diseases and pests of *A. montana*. *Armillaria mellea* root rot should be eliminated by ring barking forest trees 2 years before clearing or by uprooting and burning infected roots. If it appears in the plantation the infected tree, with all its roots, should be removed and trenching carried out to prevent spread.

C.W.S.H.

### Noted.

2003.

a KLOTZ, L. J.

Brown rot gummosis of citrus.

*Calif. Citrogr.*, 1950, 36: 48, 67-8, being part of *Circ. Calif. agric. Exp. Stat.* 396. See *H.A.*, 21: 978.

b NAKAMURA, M.

The chromosome number of the genus *Fortunella*, with special reference to diploidy of the "Golden Bean" *F. hindsii* Swingle. [Japanese.]

*Studia Citrol.*, 1941, 10: 12-17, illus., from abstr. in *Jap. J. Bot.*, 1942, 12: (17) [received 1950].

c NIKOLJSKAJA, M. N.

Two species of *Anagyrus* How. (Hymenoptera, Chalcidoidea) parasites of the comstock mealy bug. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 70: 545-7, bibl. 2.

d PRUTHI, J. S., AND LAL, G.

Photo-electric colorimetric analysis of citrus juices.

*Indian J. Hort.*, 1950, 7: 2: 15-21, bibl. 5.

e RICHARDS, A. V.

A new citrus variety—the seedless Bibile sweet orange.

*Trop. Agriculturist*, 1949, 105: 47-50, bibl. 5 + plates 7 [received 1951].

See *H.A.*, 21: 938.

f SKVORCOV, A. F.

Improving the structure of the Kolhid alluvial soil by perennial cover crops [prior to planting citrus].

*Doklady vsesojuz. Akad. seljsk. Nauk*, 1950, 15: 10: 29-34, graphs.

g SPERONI, H. A.

La gomosis o podredumbre del pie de los citrus. (Gummosis or stem rot of citrus.)

*Idia*, 1950, 3: 33/34: 35-6, illus.

## TROPICAL FRUIT AND PLANTATION CROPS.

*General.*

(See also 1597, 1598, 1951, 2111b, 2136, 2141, 2145, 2146, 2149, 2162.)

2004. BLACKIE, W. J.

**Agricultural research and policy in Fiji.**

*Agric. J. Dep. Agric. Fiji*, 1949, 20: 98-120, bibl. 21.

Following a general account of agricultural development in Fiji with tabulated data on crop acreages and exports for 1946, the history of the Agricultural Department and its research achievements are reviewed briefly, and the policy adopted for the Department is outlined. Among crops listed for particular attention in experimental work are coconuts, citrus and other fruit crops, cocoa, coffee, tea, sugar, bananas, tobacco and vegetables.

2005. SCHNELL, R.

État actuel des recherches sur la végétation de l'Afrique intertropicale française. (A review of vegetation studies in tropical French Africa.)

*Vegetatio*, 1950, 2: 331-40, bibl. 102.

The subject is discussed under the following heads: The major plant-geographical divisions; ecology; bush fires and their effect on the vegetation; plant associations and types of vegetation; mountain vegetation; and major biogeographical problems and the evolution of the vegetation.

2006. PURVES, C. M., AND HOBBS, J. C.

**Philippine agriculture—its position and problems.**

*Foreign Agric.*, 1951, 15: 1: 3-10, illus.

The senior author was an agricultural member of the Bell Mission which studied the economic and financial problems of the Philippines in 1950. The present status of agriculture is reviewed, and the main recommendations of the Commission are indicated. These include the need for emergency action to check the spread of the virus disease of abaca, for additional efforts to bring the Kadang-Kadang disease of coconuts under control, and for more extensive research on sugar cane and tobacco.

2007. MITCHELL, P.

**Horticultural districts of Queensland. 5. North Coast.**

*Qd agric. J.*, 1950, 71: 206-16, illus.

The historical development, climate and soils are described for a coastal strip of Queensland about 80 miles long by 15 to 25 miles wide, extending from the Caboolture river on the south to Gunalda on the north. The pineapple is the main fruit, followed by bananas (principally Cavendish, Mons Mare and Lady Finger with small areas of William's Hybrid, Sugar and Ducasses), citrus (mainly oranges and mandarins), papaws, avocados, strawberries (Phenomenal and Aurie), passion fruit, and pecan and macadamia nuts. The cultivation of ginger is expanding. Among vegetables the most important crop is beans, grown extensively as a winter crop; the main variety is Brown Beauty.

2008. FUJIMOTO, G., AND SHERMAN, G. D.

**Cobalt content of typical soils and plants of the Hawaiian Islands.**

*Agron. J.*, 1950, 42: 577-81, bibl. 11, being *Tech. Pap. Hawaii agric. Exp. Stat.* 197.

Cobalt contents are tabulated for a large number of soils and plants, the latter including banana, sugar cane, papaw, cabbage, carrot, celery, lettuce, melons, pole beans and tomatoes. The cobalt content of plants in Hawaii was found to be much higher than that reported for plants grown elsewhere, the average value for 56 samples being 1.62 p.p.m. and the range 0.20 to 7.50 p.p.m.

2009. ANON.

**Harvesting and packing tropical fruits and strawberries.**

*Qd agric. J.*, 1950, 71: 154-63, illus.

Detailed instructions, assisted by illustrations, are given for the sizing and packing, both for local market and export, of custard apples, papaws, strawberries, and, in less detail, the fruit of *Monstera deliciosa*.

2010. REITSMA, J., AND SLOOFF, W. C.

**Further investigations on pythium diseases.**

*Contr. gen. agric. Res. Stat. Bogor* 109, 1950, pp. 12-21, bibl. 7, illus.

From observations and experiments described it is concluded that *Pythium butleri* Subr. isolated from sisal, papaya, basella, and *Amaranthus tricolor* generally attacks young seedlings as well as young shoots of different hosts. Control measures recommended are sterilization of infested soil, using light, fast-drying, well-drained and aerated soil, and early thinning.

2011. FENNAH, R. G.

**Parasol ants. Their life history and methods for their control.**

*Proc. agric. Soc. Trin. Tob.*, 1950, 50: 312-26, bibl. 4, illus.

Two species are present in Trinidad, *Atta cephalotes* L., the large leaf-cutting species which is destructive to young plants or flushes of new growth in many species including cacao and citrus, and *Acromyrmex octospinosus* Reich, a smaller species which damages the petals of ornamental flowers. Their life history and foraging habits are described in detail. Nests can be eradicated by use of a wide range of chemicals including aldrin, dieldrin, chlordane, cynogas, DDT-oil, and BHC. Trees can be protected by physical barriers such as sticky bands or by repellants such as mercuric chloride or equal parts of salicylic acid and benzoic acid dissolved in fusel oil.

*Bananas.*

(See also 1376, 2111c, 2164.)

2012. HARPER, J. L.

**Studies in the resistance of certain varieties of banana to Panama disease. Part I. Internal factors for resistance and antibiotics. Part II. The rhizosphere.**

*Plant and Soil*, 1950, 2: 374-82, bibl. 10, and 383-94, bibl. 7.

I. There is no evidence that there is present in the



roots or rhizomes of bananas any stable substance which prevents the growth of the Panama disease organism. Discs of living tissue and media prepared from rhizomes of resistant and susceptible varieties of banana support free and equal growth of the pathogen. Alcoholic extracts of banana roots show antibiotic activity against *Bacillus subtilis*, *Bacterium solanacearum*, *Mycobacterium phlei* and ephemeral activity against *Fusarium oxysporum-cubense*. There are varietal differences in the quantity and type of antibiotic produced, but these show no correlation with disease resistance.

II. The rhizosphere flora of banana varieties differs quantitatively from variety to variety. The comparison of rhizospheres is difficult, because the form of expression of the results may take many forms, none of them completely satisfactory. In the method adopted here, the two genetic pairs of banana, Gros Michel-Congo and Silk Fig-Guindy, differ widely in the rhizosphere flora which they support, the former pair supporting the greater number of micro-organisms. Within each pair, the higher number is found on the variety susceptible to Panama disease. The nutrient requirements of rhizosphere floras are related to the sap of the banana variety from which they have been derived. A bacterium strongly antagonistic to *Fusarium oxysporum-cubense* was isolated in high numbers from the rhizosphere of the Panama disease immune Congo banana, although this was virtually absent from the susceptible Gros Michel. [Author's summaries.]—Colonial Microbiological Research Inst., Port of Spain, Trinidad.

2013. CARDEÑOZA B., R.

Acción del salitre sódico en plantas de plátano enfermas de "rayadilla". (The effect of Chile saltpetre on plantains infected with "rayadilla" disease.)

*Not. agron. Palmira*, 1950, 3: 103-8, illus.

In experiments at the Palmira agricultural experimental station, monthly applications of Chilean sodium nitrate, containing traces of 30 minor elements and applied at the rates of 62.5 and 125 g. per plant, did not result in the recovery of diseased plants and did not affect the severity of the symptoms. A slight improvement in the development of diseased plants was observed. Sundry observations on the performance of diseased plants are recorded.

2014. CARDEÑOZA B., R.

Estudio preliminar sobre agentes terrícolas posibles causantes de la "rayadilla" del plátano. (A preliminary study of soil organisms as possible causal agents of "rayadilla" disease of plantains.)

*Not. agron. Palmira*, 1950, 3: 109-23, bibl. 32, illus.

Although the evidence is by no means conclusive, preliminary experiments carried out at the Palmira agricultural experimental station indicate that "rayadilla" disease of plantains could be caused or transmitted by soil organisms, i.e. nematodes or an unidentified fungus. A detailed description of the symptoms is presented, and the literature on similar diseases of banana and manilla hemp is discussed. It is suggested that a chlorosis of coffee and cacao observed about 1939 may be caused by the same agent as "rayadilla".

2015. CARDEÑOZA B., R.

Ensayo de transmisión de un posible virus causante de la "rayadilla" del plátano, de plantas enfermas a sanas. (An attempt to transmit a virus from "rayadilla"-infected plantains.)

*Not. agron. Palmira*, 1950, 3: 125-41, bibl. 10, illus.

A comparison of the symptoms of bunchy top disease of bananas and Manila hemp and infectious chlorosis of bananas with those of "rayadilla" disease of plantains reveals a close resemblance and suggests the possibility of a common causal agent. An experiment was therefore designed at the Palmira agricultural experimental station to determine whether any virus could be transmitted from infected plantains to healthy ones by the aphid *Pentalonia nigronervosa*, a carrier of the banana viruses. After 9 months, a period much longer than the incubation period of banana viruses, only 3 plants showed mosaic symptoms, one of these being a non-inoculated control plant. These 3 plants were found to be heavily infested with eelworm, so, although the possibility of virus origin is not excluded, the evidence suggests that "rayadilla" disease is more probably the result of eelworm infection.

Cacao.

(See also 2059, 2065, 2111r, 2131, 2188.)

2016. McLAUGHLIN, J. H.

Observations on cacao in Colombia.

*Cacao Inf. Bull.*, 1950, 2: 6: 1-2.

A brief account is given of the climate and production of cacao in Colombia, the work in progress at the Palmira experimental station, diseases and pests that attack cacao, and the principal trees used for shade.

2017. VAN BEERS, W. F. J.

Notes on the growing conditions for cacao in Indonesia. [Javanese summary 1 p.]

*Contr. gen. agric. Res. Stat. Bogor* 101, 1950, pp. 21, bibl. 27.

Conditions for cacao growing in Indonesia are very different from those obtaining in the Gold Coast. Climate and soils are not generally uniform over a large area and the suitable soils are seldom covered by primeval forest. There are, however, scattered areas that appear to be highly suitable. In this paper, information, obtained from the literature, on the specific conditions of climate, soil and shade required by cacao is presented as a guide.

2018. BURCHARDT, A., AND JÖRGENSEN, H.

A preliminary note on cacao work at Hacienda Clementina, Ecuador.

*Cacao*,\* 1950, 2: 7: 1-3.

Hacienda Clementina, situated in the province of Los Rios and once one of the most famous of the Ecuadorian cacao estates, was acquired by a Swedish company in 1947 in a derelict condition. Detailed information is given here on the rehabilitation work. Trinidad clonal cacao plants have been imported by air. Propagators, similar to those used at La Pastora, Trinidad, are filled with fresh or weathered sawdust which is

\* Formerly *Cacao Inf. Bull.*

renewed after about 12 months. The cuttings are dipped in a solution of 2 gr. 3-indolebutyric acid per litre 50% alcohol, and the more easily rooted clones like I.C.S. 1 show an average rooting percentage of 85. After 6 weeks the plants are set out in temporary nursery beds, and after a further 4 to 6 months they are transplanted to the field with a ball of soil wrapped in leaves of *Heliconia bibhai*. To facilitate transplanting, shade over the nursery, normally kept at 15-17 foot candles on a sunny day, is removed 2 weeks before lifting. Various methods of establishment in the field are being tried out. Selection work is also in progress on existing old trees, including trees of Cacao Nacional.

2019. JOLLY, A. L.

**Field performance of cacao cuttings.**

*Proc. agric. Soc. Trin. Tob.*, 1950, 50: 239-55.

On exceptionally good "chocolate" soil in Trinidad 7-year-old I.C.S. 1 clonal cacao trees raised from cuttings have yielded 2½ times as much as seedling trees raised from selected cacao. The records suggest that on good land clonal cacao planted 12×12 ft. can be expected to yield 300 lb. per acre at 4 years, and 1,000 lb. at 7 years. The endurance of cuttings remains to be determined, but, although in one trial yields levelled off after 7 years, there has been no indication of a decline up to 11 years. Clones have been found to vary in their precocity; I.C.S. 1, 45, 84 and 95 appear to reach their maximum in 4-5 years, whereas I.C.S. 89 has given increasing yields up to 10 years. Variations within plots of both seedling and clonal cacao are discussed in some detail with the aid of diagrams, the former being characterized by a much wider range of yields and by the presence of non-producers. On the other hand, under poor soil conditions, poor yielders and non-producers are found in clonal as well as seedling cacao. In the future planting of high yielding clonal cacao, it is suggested that more care should be taken in selecting sites, more attention be paid to the care of young plants in the first 3 years to avoid the need of supplying gaps, and that consideration be given to closer spacing to reduce weeding and exploit high early yields to the full.

2020. NAUNDORF, G.

Contribución a la propagación vegetativa del cacao (*Theobroma cacao* L.) por estacas. Ensayos comparativos entre los diversos métodos. (The vegetative propagation of cacao by cuttings. Comparative trials with different methods.) [English summary ½ p.] *Not. agron. Palmira*, 1950, 3: 155-66, bibl. 37, illus.

The effects of various treatments with growth substances on the rooting of cacao cuttings were studied at the Palmira agricultural experimental station. The treatments used were (1) the dip method with  $\alpha$ -naphthaleneacetic acid, (2) the dust method with 3-indolebutyric acid, (3) the wounding method, in which 2 vertical incisions were made at the base of the cuttings which were then treated as in (1) or (2) above, and (4) the "mother plant" method, a modified aerial layering [see *H.A.*, 20: 3226]. The most rapid rooting and largest number of roots were obtained with the wounding method, 90% rooting being obtained in 30 days, the cuttings having an average of 5-8 roots each.

45% had rooted in 20 days, with both lignified and semi-lignified cuttings. More satisfactory root growth was obtained with  $\alpha$ -naphthaleneacetic acid than with indolebutyric acid. With the "mother plant" method the best results were obtained by using a 0.25% paste of  $\alpha$ -naphthaleneacetic acid and leaving the treated shoots on the tree for 7 days. This practice resulted in 85% rooting within 30 days, the type of root system developed being very satisfactory. This last method is recommended for the propagation of valuable trees where a limited quantity of wood is available, as the cuttings that do not callus properly may be left on the tree.

2021. NAUNDORF, G.

Influencia de las lesiones mecánicas en el enraizamiento de estacas de *Theobroma cacao* L. (The effect of mechanical wounding on the rooting of cacao cuttings.) [English summary 2 lines.] *Not. agron. Palmira*, 1950, 3: 167-71, bibl. 3, illus.

In one experiment, carried out at the Palmira agricultural experimental station, all methods of wounding resulted in a higher percentage of rooting and a larger number of roots than the controls, the best results being given by hammering the ends of the cutting under water. In a second experiment the unwounded controls rooted the best.

2022. NAUNDORF, G., AND VILLAMIL G., F.

Contribución al estudio de la fisiología del cacao (*Theobroma cacao* L.). Tratamientos con ácido  $\alpha$ -naftil acético y su influencia sobre la caída prematura y marchitamiento de los frutos jóvenes. Tercera nota. (A contribution to the study of the physiology of cacao. III. Treatments with  $\alpha$ -naphthaleneacetic acid and their effect on premature fruit fall and cherelle wilt of the young fruits.) [English summary 3 lines.] *Not. agron. Palmira*, 1950, 3: 173-4, bibl. 2, illus.

Earlier work at the Palmira agricultural experimental station had shown the value of hormone treatments for the prevention of premature fruit fall and cherelle wilt of cacao [see *H.A.*, 20: 400 and 20: 3214]. In the present experiment, 2 sprays with 0.02%  $\alpha$ -naphthaleneacetic acid, on 10 and 25 March respectively, reduced fruit shedding from 90% to 3%.

2023. MACLEAN, J. A. R.

Single-pod fermentation of cacao. *Nature*, 1950, 166: 910.

A fermentation process is described which makes it possible to assess the quality of the first one or two pods produced by young experimental trees.—West African Cacao Research Inst., Tafo.

2024. POSNETTE, A. F., ROBERTSON, N. F., AND TODD, J. M.

Virus diseases of cacao in West Africa. V. Alternative host plants. *Ann. appl. Biol.*, 1950, 37: 229-40, bibl. 7, illus.

Twenty-eight tree species from 10 families were tested



for their susceptibility to virus 1A, 18 species from 4 families for susceptibility to viruses 1C and 1M, and 15 species from 5 families for susceptibility to Offa Igbo Nigerian cacao virus. Only species from the Sterculiaceae and Bombacaceae were found to be susceptible. The effects of the viruses were less severe than on cacao. In *Ceiba pentandra* the spines were suppressed. The mealybug vectors of the viruses have a very much wider range of host plants than have the viruses they carry. Of the species susceptible to viruses, *Ceiba pentandra* and *Cola cordifolia* are commonly found in or near cacao plantations and should be destroyed. *C. pentandra* is a very large buttressed tree and both species sucker freely after felling of the main trunk. It is necessary, therefore, to find some method of poisoning them and to remove seedlings and saplings systematically.—W.A.C.R.I., Tafo. C.W.S.H.

2025. POSNETTE, A. F., AND ROBERTSON, N. F.  
Virus diseases of cacao in West Africa. VI.  
Vector investigations.

*Ann. appl. Biol.*, 1950, 37: 363-76, bibl. 17.

Increasing the number of nymphs of *Pseudococcus njalensis* increased the infection rate with cacao virus 1A and 1M 95% with 25 insects. There was no evidence that large numbers of insects give an infection rate (or "mass action" effect) higher than would be expected if their inoculations were local and independent. Transmission of virus by the adults of *Pseudococcus citri* was higher than transmission by nymphs and it is pointed out that the use of mixed instars increases experimental error. Immature leaves with red-veining provided the best source of the viruses. *P. njalensis* nymphs took 16 minutes to penetrate plant tissues with their stylets. Infection rates increased with time of feeding up to 50 minutes. Transfers of infected insects to fresh plants gave low infection rates. Both viruses 1A and 1M are therefore regarded as non-persistent, though, with virus 1M, persistence up to 36 hours was shown in insects starved after the infection feed. Starvation before infection caused an increased settling rate and an increased infection rate with infection feeds up to 10 hours. Insects starved after infection showed a decline in this infectivity after about 20 hours, and there was no transmission after 36 hours' starvation. An experiment showed that viruses 1A and 1M were seldom so closely associated that they could be transmitted together by one vector.—W.A.C.R.I., Tafo. C.W.S.H.

2026. POSNETTE, A. F.  
Virus diseases of cacao in West Africa. VII.  
Virus transmission by different vector species.  
*Ann. appl. Biol.*, 1950, 37: 378-84, bibl. 14.

This investigation was carried out to discover which of 17 viruses could be transmitted by 13 species of Coccoidea, and to find out whether the viruses could be classified by their vectors. No vector was found for virus 1S from Nigeria, although *Pseudococcus* sp. near *celtis* (H6424) was found nearby when this virus was discovered. The results of the transmission tests are tabulated. Biological races were shown to occur in *P. citri*, one of which failed to transmit virus 1C. The only virus-vector specificity was that viruses transmitted by *P. longispinus* were not usually transmitted by *Ferrisia virgata*.—W.A.C.R.I., Tafo. C.W.S.H.

2027. DANTAS, B.

A epifitologia e o controle da "vassoura de bruxa" e da "podridão parda" do cacau-iro—bases teóricas e resultado econômico. (The epiphytology and the control of the "witches' broom" and "brown rot" of cacao—theoretical bases and economic results.)

*Bol. Agric., Pernambuco*, 1949, 16: 3/4: 239-53, from abstr. in *Rev. appl. Mycol.*, 1951, 30: 27.

The symptoms, epiphytology, and control of these two destructive diseases of cacao in the plantations of Amazonia, Brazil, are described. Three successive methods may be adopted for the control of witches' broom—elimination of infection foci, adjustment of environmental conditions, and chemical treatment. Shade for new plantations should be provided by leguminous trees with very small leaves, spaced so that the canopies do not become densely interlaced. In established plantings the shade trees should be pruned, especially the lower branches impinging on the crowns of the adjacent cacao trees, or excessive numbers thinned. The ground flora should be mown. The first treatment with 1% bordeaux mixture plus 0.1% wheat flour should be applied during December, the second in March, and the third in the second fortnight of May or the first part of June.

*Cinchona.*

2028. WINTERS, H. F.  
Preventing damping-off in cinchona seedbeds.  
*Trop. Agriculture Trin.*, 1950, 27: 123-6, bibl. 8, illus.

The results of this study indicate that damping-off disease of cinchona seedlings can be prevented by treating the beds with chloropicrin or covering the soil with sphagnum moss. Where the soil was both fumigated with chloropicrin and surfaced with sphagnum moss, germination was not impaired and growth was greatly stimulated. Seedlings grown on plots of sphagnum moss alone were entirely free of the disease, but the plants suffered from nutrient deficiency. Germination and growth were good on untreated soil plots surfaced with 1 inch of sphagnum. Cinchona seeded directly on the soil mixture germinated well, but the plants suffered severely from damping-off. Fumigation of the soil with chloropicrin prevented damping-off, but interfered with germination when the beds were seeded too soon after treatment. The use of a sphagnum moss layer over soil either fumigated with chloropicrin or untreated is suggested for other plants which are especially tender in the early seedling stage. [Author's summary.]

*Cloves.*

(See also 2154, 2188.)

2029. SHEFFIELD, F. M. L.  
Studies of the clove tree. II. Histology, with special reference to sudden death disease.  
*Ann. appl. Biol.*, 1950, 37: 23-45, bibl. 24, illus.

A detailed study was made of the histology of the

clove tree, both when healthy and when expected to die from sudden death disease. Some unusual histological characters are commonly associated with the disease, but they also occur in healthy cloves. Some of the characters may occur earlier or be more accentuated in the disease suspect than in the healthy tree. Nevertheless it is considered that the disease is caused by a pathogen. Fungi in the absorbing roots are not found in any great numbers until the tree has wilted. The disease shows many similarities to other diseases proved to be of virus origin, although there has so far been no evidence to support this from microscopic examination. Peculiar histological characters in diseased trees include secondary thickening of the internal phloem, necrosis of the first formed cells keeping pace with the production of new cells; exceptionally narrow and thin-walled cambium cells; low starch reserves; abundant oil secreting glands; occasional dead cells in all tissues; uneven plastid development in the leaf; numerous stomata communicating with unusually small cavities; air spaces in the mesophyll small or absent; and amorphous bodies in the leaf cells.—Clove Research Scheme, Zanzibar. C.W.S.H.

2030. NUTMAN, F. J.

**Studies of the clove tree. III. The effect of the sudden-death disease on water relations.**

*Ann. appl. Biol.*, 1950, 37: 584-90, bibl. 11.

Root disorganization is present from a very early stage in sudden-death disease, but the investigations described do not support the view that there is a sequence of root disorganization, reduced absorption, increasing water strain and leaf degeneration. The experiments showed that in suspected plants (i.e. those in the very early stages of the disease) the water status of the leaves was more favourable than in healthy trees. Water deficit in the leaves does not rise appreciably until early wilt has started. The transpiration power and assimilation rate were reduced in suspected trees, and this is explained by the reduced stomatal aperture. The reduction of transpiration rate is itself considered to explain the improved water balance of the suspected tree, and it is thought possible that the root disorganization may be a direct consequence of the leaf changes, particularly as the clove tree in any case lacks carbohydrate reserves. These results are considered to furnish additional evidence in favour of the hypothesis that the disease is caused by either a toxin-producing fungus or a virus.—Clove Research Scheme, Zanzibar. C.W.S.H.

2031. REITSMA, J., AND SLOOFF, W. C.

**Leaf diseases of clove seedlings, caused by *Gloeosporium piperatum* E. & E. and *Cylindrocladium quinqueseptatum* Boedijn et Reitsma.**

*Contr. gen. agric. Res. Stat. Bogor* 109, 1950, pp. 50-9, bibl. 6, illus.

An alga, *Cephaleuros mycoidea*, has been found associated with leaf spot, and two fungi, *Gloeosporium piperatum* and *Cylindrocladium quinqueseptatum*, have been experimentally shown to cause leaf spotting on clove seedlings. Control measures which have been effective against pests and diseases in a clove plantation near Bogor are (1) shading the seedlings to prevent sunburn lesions, (2) spraying with a kerosene-soap-spirit emulsion to control coccids, and checking ants

with derris powder, (3) spraying with bordeaux mixture to check leaf diseases, (4) applying a nitrogen fertilizer when the seedlings are 4 months old, to be repeated when necessary.

**Coconuts.**

(See also 1287, 1998, 2006.)

2032. MURRAY, D. B.

**Coconut growing in Trinidad and Tobago.**

*Proc. agric. Soc. Trin. Tob.*, 1950, 50: 193-200.

General advice is given on soils, varieties, selection of seed, nursery management, seedling selection, spacing, cultivation, fertilizers and harvesting. It is noted that among varieties the Malayan dwarf coconut has never proved popular; among the ordinary tall coconuts it is possible to recognize several types including the so-called Venezuelan variety and the Blanchisseuse. Yields were recorded for 600 trees on one estate for a year; 9% comprising the best trees yielded 21% of the total crop, and 19% comprising the worst trees yielded 3%. For cultivation, increasing use is being made of rotary hoes. In 2 fertilizer trials, that have been running for 3 years, there has been a response to N, applied as 3 lb. sulphate of ammonia per tree, but so far no response to P or K.

2033. DAVIS, T. A.

**Branching in some Indian palms.**

*Indian Coconut J.*, 1950, 3: 135-45, bibl. 29, illus.

The literature on forms of branching found in palms is discussed. In the coconut, cases are recorded and illustrated in which three separate plants have developed from one nut, in which palms have suckered freely from the base, and in which up to 16 branches have developed aerially; other forms of abnormality have also occurred. Branching is also sometimes found in *Borassus flabellifera*, *Phoenix* sp. and *Areca catechu*. Branching may occur either as a result of hereditary factors or through mechanical injury. The general notion that branched palms are always unproductive is unfounded.

2034. LIYANAGE, D. V.

**Preliminary studies on the floral biology of the coconut palm.**

*Trop. Agriculturist*, 1949, 105: 171-5, bibl. 5 [received 1951].

The duration of the two sexual phases was studied in the widely grown tall coconut palm, the dwarf palm of Malayan origin, and the fairly tall King coconut in which the epicarp of the nut is golden yellow in colour. In all the palms the male phase lasted 18 to 22 days; the female phase lasted 5 to 7 days in tall palms and 10 to 16 in the two other types. In the tall palm the male phase is normally completed 1 to 2 days before the female phase begins, and, as the chances of inter-spadix pollination are also rather remote, these palms are generally cross-pollinated. With the dwarf and King coconut palms male and female phases overlap, and self-pollination is the general rule. In studies on pollen germination, 10% cane sugar plus 2% gelatine proved a satisfactory medium for germination. In studies on pollen storage, the viability of pollen grains was prolonged by storage in a desiccator with 43.4%



H<sub>2</sub>SO<sub>4</sub> and reduced by storage in a saturated atmosphere.

2035. PONTO, S. A. S., AND MO, T. T.

De bestrijding van een slakrups, *Darna* (Orthocraspeda) *catenatus* (Sn.), op klapper in het Palu-Dal. (The control of *Darna catenatus* (Sn.) on coconut trees in the Palu valley, Central Celebes.) [English summary 1 p.]

Landbouw, 1950, 22: 69-81, bibl. 4, map.

Observations on the occurrence of the coconut limacodid, *Darna catenatus*, in the Palu valley have been made since 1933. It has been noticed that outbreaks occur frequently in the dry northern part of the valley, but very rarely in the southern part where the annual rainfall exceeds 1,000 mm. Outbreaks in other parts of the Celebes are much less frequent and less severe than in the Palu valley. Heavy infestations result in nut fall and the trees take 1½-2 years to recover. The young larvae skeletonize the under surface of the leaves and the older larvae feed on the edges of the leaflets. Details are given of the life cycle of the moth. Although the coconut palm is the principal host plant, outbreaks have also been observed in sago palm and oil palm plantations. The pest has been successfully controlled since 1937 by a systematic destruction of centres of infestation. Plantations were inspected regularly every 2 months and, wherever more than 3 larvae were found per leaf, the older leaves of infested trees were cut off and burnt. As outbreaks usually develop on small groups of palms or on isolated trees, it is possible to keep extensive areas free from the pest by sacrificing a relatively small number of trees.—Gen. agric. Res. Stat., Macassar.

2036. BUSTRILLOS, A. D., AND BANZON, J.

The equilibrium moisture of copra at various relative humidities.

Philipp. Agric., 1949, 33: 77-87, bibl. 6, illus.

Equilibrium moisture curves were plotted for copra within the range of 0% to 85% relative humidity at room temperature (28.5° ± 3.5° C.), and within the range of 0% to 95% relative humidity at 40° ± 2° C. A true moisture equilibrium appeared to exist between copra and the atmosphere. When the relative humidity exceeded 85% at 28.5° C. or 95% at 40° C., moulds attacked the copra regardless of their initial moisture contents, and equilibrium moisture determinations could not therefore be made at higher relative humidities.

### Coffee.

(See also 1295, 1599, 2111a, e, f, g, n, r, 2182, 2188.)

2037. TESTA, J.

Exportações de café para a Europa. (Exports of coffee to Europe.)

Bol. Super. Serv. Café, S. Paulo, 1950, 25: 86-91.

This analysis of the present situation as it affects Brazil contains coffee import figures for the 5 continents since 1911 and gives Brazilian coffee exports since that date.

2038. TESTA, J.

Os cafésais no norte do Paraná. (Coffee production in north Paraná.)

Bol. Super. Serv. Café, S. Paulo, 1950, 25: 506-10.

Figures are given to show the rapid increase in coffee production that has occurred in the northern part of the State of Paraná, Brazil, during the last 30 years. Since 1920 the production of exportable coffee has increased 30-fold. From a table giving the production figures of exportable coffee for the various States of Brazil, it can be seen that Paraná is second only to São Paulo. The average yield of trees is very high, being 100 arrobas (about 1,500 kg.) per 1,000 trees. On all suitable soils coffee is grown practically as a monoculture. The greatest danger to production is frost and, as shade trees give considerable protection, it is suggested that shaded plantations should be given an extensive trial.

2039. KRUG, C. A., MENDES, J. E. T., AND CARVALHO, A.

Taxonomia de *Coffea arabica* L. II. *Coffea arabica* L. var. *caturre* e sua forma *xanthocarpa*. (The taxonomy of *Coffea arabica*. II. *Coffea arabica* L. var. *caturre* and its yellow-fruited form *xanthocarpa*.) [English summary ½ p.]

Brasília, 1949, 9: 157-63, bibl. 6, illus. [received 1951].

A study of the coffee variety *caturre*, which is believed to have originated in the State of Minas Gerais, Brazil, and which is cultivated on a small scale in the State of Espírito Santo, was started at the Instituto Agrônomo, Campinas, in 1937. It is smaller than the bourbon variety, from which it probably originated, and has smaller flowers, but the leaves, fruits and seeds are slightly larger. The results of a taxonomic study and information on the genetic constitution of the *caturre* variety are presented in this paper. It was found that its principal morphological characters are largely determined by a single pair of dominant genes. It has a high yielding capacity and may be particularly well adapted to cultivation under shade. The yellow-fruited form (*xanthocarpa*) is similar to the parent variety in all respects except colour.

2040. CARVALHO, A., AND KRUG, C. A.

Genética de *Coffea*. XII. Hereditariedade da cor amarela da semente. (The genetics of coffee. XII. Inheritance of the yellow colour in the seed.) [English summary ½ p.]

Brasília, 1949, 9: 193-202, bibl. 7, illus. [received 1951].

The results of a genetical study of the yellow-seeded mutant of *Coffea arabica* var. *typica* are presented. This mutant has proved useful in studies of the biology of the coffee flower and also in showing that the bulk of the coffee seed is true endosperm.—Inst. Agron. Campinas.

2041. FILHO, H. A.

Melhoramento do cafeeiro. (Improvement of coffee.)

Bol. Super. Serv. Café, S. Paulo, 1949, 24: 241-6, bibl. 4.

Five large-scale trials were set up in the main coffee-growing areas of the State of São Paulo, Brazil, with the progeny of plants selected at the Institute of Agronomy, Campinas, from the varieties bourbon, *caturre*, sumatra, maragogipe A.D., *sempreflorens* and *laurina*. The trials were divided into shaded and

unshaded plots in order that the effect of shade on production and type of seed might be studied. Data obtained during the first year of cropping, 1948, showed that total yield in the unshaded plots was in all cases higher than in the shaded ones, the average yield being  $4\frac{1}{2}$  times as high.

2042. MENDES, C. T.

Variedades de cafeeiros. (Coffee varieties.) *An. Esc. sup. Agric. "Luiz de Queiros", Piracicaba*, 1948, 5: 277-91+tables, bibl. in text [received 1950], and reprinted in *Bol. Super. Serv. Café, S. Paulo*, 1950, 25: 104-9, 188-93.

From a study made of the relationship between drinking quality and size of seed in the coffee varieties Sumatra, Bourbon, Nacional, and Amarelo de Botucatú, it is concluded that there is no obligatory correlation between the two although in many cases such a correlation does exist. The copious data obtained are tabulated. Figures are also given showing the great annual variation in coffee production in the State of São Paulo.

2043. MENDES, J. E. T.

A enxertia do cafeeiro. III. (Grafting coffee. III.) *Bol. Super. Serv. Café, S. Paulo*, 1948, 23: 386-91, bibl. 4, illus. [received 1950].

When grafting coffee in the normal way, the wood of both stock and scion must be in an unglified condition. This leads to many difficulties, the most serious being that the graft must be placed relatively high, and that the stock is liable to overgrow the scion. The author describes 2 new methods that have been used with success. (1) The epicotyledonary graft, in which the stock is grafted just above the cotyledons or first pair of leaves with scion wood from the terminal shoot of a young plant. The stock is thus reduced to little more than a root system. (2) The lateral cleft graft, in which the stock may be grafted at any convenient height and the top cut back after leaves have developed on the scion.

2044. TESTA, E.

Caféizais novos em terras "velhas". (Re-planting coffee on old soil.) *Bol. Super. Serv. Café, S. Paulo*, 1948, 23: 608-12 [received 1950].

The author maintains that the eroded coffee soils of the State of São Paulo could be replanted with success and brought back to their former productivity, provided that coffee were grown intensively, that the best modern cultural practices were used and that the organic matter content of the soil were raised and maintained at a high level. A basic manurial treatment with a mixture of manure, turf, lime, and sulphate of potash, which should be followed with applications of any organic matter available, is suggested.

2045. TESTA, J.

Dois depoimentos sobre a restauração de caféizais em zona velha. (Two examples of the successful restoration of coffee plantations in the "old" coffee areas.) *Bol. Super. Serv. Café, S. Paulo*, 1950, 25: 181-6, illus.

In support of his claim that the "old", eroded coffee

soils of Brazil can be made productive again, the author cites 2 examples of plantations that have been brought back into full production by proper management and good soil conservation practices. In one case a 60-year-old plantation at Itapira, which in 1945 produced 25 arrobas (about 375 kg.) per 1,000 trees, was producing 3 times that amount in 1950. The treatment given, which consisted largely of applying heavy dressings of compost, is described. In the other case the yield of an old plantation at Baurú was raised from about 6 to 68 arrobas per 1,000 trees in 8 years. The maintenance costs are analysed.

2046. CALIL, J.

Aumenta a formação de cafézais nas antigas zonas produtoras. (Plant up more coffee in the old production areas.) *Fôlha da Manhã*, 24 June, 1950, reprinted in *Bol. Super. Serv. Café, S. Paulo*, 1950, 25: 422-4.

Although the soils of the old coffee areas in Brazil are now badly eroded, they may still be profitably planted up with coffee if the culture is intensive and the plantations are treated with the same care as orchards. The main essentials in replanting are (1) the choice of productive varieties, (2) the control of erosion, and (3) systematic applications of compost. Recommendations on these points are made, based largely on work done at the Institute of Agronomy, Campinas.

2047. NETO, P. C.

Restauração da lavoura cafeeira. (Restoration of coffee culture [in Brazil].) *Fôlha da Manhã*, 22 July, 1950, reprinted in *Bol. Super. Serv. Café, S. Paulo*, 1950, 25: 425-8.

Although the use of *Cassia* and many other species of shade tree in coffee plantations in Brazil has resulted in failure, good results have been obtained with "ingázio" [*Inga* spp.]. Examples are given of old plantations that have been restored to productivity as a result of establishing a shade of these trees.

2048. MENDES, J. E. T.

Culturas intercalares em cafézais. (Inter-cropping coffee.) *Bol. Super. Serv. Café, S. Paulo*, 1950, 25: 498-504.

An experiment was carried out at the Pindorama Experimental Station, Brazil, from 1936 to 1949 inclusive, to determine the effect of growing secondary crops of millet, cotton, beans or rice in coffee plantations. In all cases intercropping reduced the yield of coffee, millet having the most detrimental effect, and beans, grown during the wet season, the least. Millet was the only crop that yielded regularly every year; all the others gave relatively low yields and, in unfavourable seasons, the crops failed completely.

2049. RAYNER, R. W.

The results of the multiple stem questionnaire. *Mon. Bull. Coffee Bd Kenya*, 1950, 15: 416-18, 439-41 and 462-5.

A questionnaire was prepared in 1949 to obtain information on coffee growers' experiences with the multiple-stem system of growing coffee in Kenya. The questionnaire consisted of 22 main questions grouped into the following 5 sections: (a) general,



(b) starting the system, (c) the cycle, (d) the new cycle, and (e) other observations. The questions included details of altitude, rainfall, acreage, ground cover, spacing, years of experience, yields and variability of cropping, conversion of single-stem trees to multiple-stem, pruning, shading, and pests. The answers are remarkable mainly for their divergence, but should form a useful basis for planning future investigational work on the system.

2050. FRANCO, C. M., AND MENDES, H. C.  
Sintomas de deficiências minerais no café-iro. (Mineral deficiency symptoms in coffee.) [English summary  $\frac{1}{2}$  p.]  
*Bragantia*, 1949, 9: 165-73, bibl. 10, illus. [received 1951].

Coffee plants (*Coffea arabica* var. *bourbon*) were grown in nutrient solutions at the Instituto Agrônômico, Campinas, for the purpose of studying deficiency symptoms of N, P, K, Mg, Ca, S, and Fe. The methods employed are described. A modified Hoagland's solution was used, the amount of phosphate supplied in the basic solution being reduced to one-third of that given in Hoagland's formula. The plants grown in this solution exhibited phosphorus deficiency symptoms, thus disproving the theory that coffee plants require very small amounts of phosphorus. Fe deficiency symptoms were exhibited by plants growing in solutions containing  $\text{KH}_2\text{PO}_4$  when the pH was higher than 5.5. The deficiency symptoms obtained in these studies are described and illustrated by photographs and some excellent coloured plates.

2051. FIEDLER, O. G. H.  
Chlorose des Kaffees in Ostafrika. (Chlorosis of coffee trees in East Africa.)  
*Phytopath. Z.*, 1950, 17: 111-14, bibl. 6.

A chlorosis of coffee trees in East Africa (Tanganyika and Kenya) is discussed in relation to the climate in the coffee-growing regions, and it is concluded that this particular disorder is not due to unfavourable soil conditions, but is a result of intense insolation following early morning mists. Shaded trees do not show this trouble.

2052. MENDES, L. O. T.  
Determinação do potencial biótico da "broca do café"—*Hypothenemus hampei* (Ferr.)—e considerações sobre o crescimento de sua população. II. A importância da diminuição do índice inicial de infestação no grau final de frutos de café atacados pela praga. (Determination of the potential incidence of the coffee berry borer, *Hypothenemus hampei*, and considerations on its increase. II. The importance of the initial infestation factor in determining the final percentage of attacked fruits. [English summary  $\frac{1}{2}$  p.]  
III. Curva termometabólica da "broca do café" e sua aplicação no estudo do crescimento de sua população. (The thermometabolic curve of the coffee berry borer and its application in the study of the population increase.) [English summary  $\frac{1}{2}$  p.]

IV. Uma correção no cálculo do potencial de oviposição do inseto. (IV. A correction in the calculation of the potential egg-laying capacity of the insect.)

*Bragantia*, 1949, 9: 203-14, bibl. 2, 215-26, bibl. 2, and 227-8, bibl. 2 [received 1951].

*Part II.* The author presents a new equation indicating the population growth of the coffee berry borer under ideal conditions. By means of a second equation derived from this, it is now possible to calculate the percentage of attacked fruits at any given time, between the limits 0 and 4. The derived equation is based on the following biological data: (a) the normal sex ratio is 1 male: 9.75 females; (b) only the females attack the fruits; (c) an active female may attack as many as 4 fruits, and in each fruit can deposit an average of 20.97 eggs. In this paper three theoretical examples are given of the application of the new equation. The results obtained show the importance of the initial infestation factor in determining the final percentage of attacked fruits.

*Part III.* The effect of temperature on the life cycle of the coffee berry borer is considered. A graph is presented indicating the increase in the number of attacked fruits throughout the season, where the calculated time is plotted according to the mean temperature of the month. The curves indicate the importance of the temperature factor in determining the degree of infestation under field conditions.

*Part IV.* An error made in the calculation of the egg-laying capacity of the coffee berry borer in Part II of this series is pointed out, and the equations involving this figure are duly amended.—Inst. Agron., Campinas.

2053. TOSELLO, A., AND DE SOUZA, A. J.  
Catadeira mecânica de café broqueado. (Mechanical separation of bored coffee.)  
*Bol. Super. Serv. Café, S. Paulo*, 1948, 23: 600-7, bibl. 2, illus. [received 1950].

A machine for separating coffee beans damaged by the coffee berry borer from undamaged beans after fermentation is described and illustrated. Preliminary experiments to determine the efficiency of the machine indicated that this was proportional to the percentage of damaged berries; when the percentage fell below 10, use of the machine was no longer economic. The percentage of bored berries could be reduced from 18 to 10 in 1 hour. The consumption of energy was small, and 1 operator could manage 2 machines. Costs are estimated.

2054. SEIXAS, C. A.  
Cochonilhas do cafeeiro. (Coffee scale insects.)  
*Bol. Super. Serv. Café, S. Paulo*, 1950, 25: 96-102.

The 4 species considered are *Coccus viridis*, *Saissetia hemisphaerica*, *Pulvinaria* sp. and *Pseudococcus* sp. Notes on their distribution in the State of São Paulo and on insects and fungi associated with them are followed by directions for their control. These include encouragement of parasites, control of ants by dusting the soil, trunk and branches up to 50 cm. with 1.5-2.0% BHC, stimulating growth of the trees with applications of organic manures, and spraying with oil emulsions (such as Volck) for control of the first 3 species of scale, and with "Sulfocálcica" (a mixture

of lime and flowers of sulphur in water) for control of *Pseudococcus*. The preparation of the insecticides is described.

### Guavas.

(See also 2174.)

#### 2055. MENON, H. B.

El cultivo del guayabo. (Guava culture.)

Agric. venezol., 1950, 15: 145: 43-7, bibl. 11.

A botanical description of the plant is followed by notes on the more important varieties, climatic and soil requirements, cultural practices in the nursery and in the field, pests and diseases, harvesting and uses.

### Hard fibres.

(See also 2182.)

#### 2056. OCFEMIA, G. O.

The rapid dissemination of the mosaic disease of abacá, or Manila hemp plant (*Musa textilis* Née), in the field.

Philipp. Agric., 1949, 33: 142-4, bibl. 4.

Transmission tests have shown 4 aphids, *Aphis gossypii* Glover, *A. maidis* Fitch, *Rhopalosiphum nymphaeae* Linn., *R. prunifoliae* Fitch, to be vectors of abacá mosaic caused by a strain of *Marmor cucumeris* Holmes. The two species of *Aphis* were found to transmit mosaic between wild *Canna indica* and abacá and between corn [maize] and abacá. To control the disease it is suggested that wild cannas and graminaceous weeds should be suppressed as far as possible in the neighbourhood of abacá fields. The most effective way to reduce the incidence of infection, however, would be to use clean suckers in planting new areas.

### Mangoes.

#### 2057. FRANSSSEN, C. J. H.

Levenswijze en bestrijding van de manggaboktor (*Rhytidodera simulans* White). (Biology and control of *Rhytidodera simulans* on mangoes.) [English summary 3½ pp.] Landbouw, 1950, 22: 1-38, bibl. 15, illus., also published as Meded. alg. Proefst. Landb. Bogor 95.

The mango beetle, *Rhytidodera simulans*, is a widespread pest in Indonesia. In 1941 the loss of branches due to *Rhytidodera* infestation was estimated at 20% in the Cheribon district, the most important mango centre in the islands. The larvae bore into the tops of young shoots and from there gradually migrate into the older wood and, in some cases, have even been found in the trunks. A circular tunnel is bored just beneath the bark with the result that the branch breaks off at this point. Detailed information is given on the biology of the pest. Field and laboratory studies showed that first stage larvae are unable to enter healthy young shoots of mango, and infestation is only successful on shoots previously damaged by *Gloeosporium* spp., *Chlumetia transversa* or *Cryptorhynchus goniocnemis*. On the kanari tree (*Canarium* sp.), which is also a host plant, primary attacks may be successful. *M. indica* was found to be far more susceptible than *M. odorata* or *M. foetida*; infestation

has not yet been observed on *M. caesia*. The method of cultivation appears to have a considerable effect on the degree of infestation. Trees planted in mixed compounds were the most seriously damaged; those grown extensively in forests or isolated on cultivated ground were less affected, while infestation was rarely observed on trees planted in orchards. Moist conditions appeared to be most favourable for the development of the beetle. Direct control by means of insecticides is not possible, but indirect control by preventing primary damage to the shoots is recommended. The trees should be planted at least 10 m. apart, and not interplanted with other trees. At regular intervals the trees should be inspected and branches showing signs of infestation should be cut out.

### Oil palms.

#### 2058. DE POERCK, R. A.

Contributions à l'étude du palmier à huile africain (*Elaeis guineensis* Jacq.) II and III. (Contributions to the study of African oil palms II and III.)

Oléagineux, 1950, 5: 689-94, bibl. 30, illus.

Following an introductory summary on the floral biology of *Elaeis guineensis* (see H.A., 21: 1078) the author in Part II discusses the sterility of the form *pisifera* (see also H.A., 20: 1091), which arises in the proportion of about 25% when *tenera* is self-pollinated. The shell-less fruit of *pisifera* would be of great commercial importance, if the partial sterility of this variety were overcome, and its bunch yield were raised to about 200 kg. per tree per year, producing approximately 52 kg. of oil. The pollination of the thick-shelled *dura* variety with *pisifera* yields 100% thin-shelled *tenera* seed, which, among other things, proves *pisifera* pollen to function normally. The fertility of female inflorescences is known to vary, as there are strains with only 10% sterility. The possibility of producing a high-yielding, fertile *pisifera* line by breeding and selection cannot therefore be ruled out. The development of non-pollinated *tenera* "fruits" and of non-pollinated and pollinated *pisifera* flowers is described, the two latter with photomicrographs. In sterile *pisifera* flowers the embryo sac disappears about two weeks after pollination; the fruit ceases to increase in volume and drops about 2-4 weeks later. The development of a fertile *pisifera* flower, on the other hand, hardly differs from that of a *tenera* flower. Part III is devoted to a cytological study of the three *E. guineensis* varieties *dura*, *tenera* and *pisifera* and of *E. melanococca*. The literature on the cytology of oil-bearing palms in general is reviewed.—Yangambi, Belgian Congo.

#### 2059. WILSHAW, R. G. H.

Agronomic and breeding research on rice, oil-palms, and cacao in Malaya. Pt. II. Oil-palms and cacao.

Emp. J. exp. Agric., 1950, 18: 276-80, bibl. 12.

*Oil palms*.—In 1949 there were 84,100 acres under oil palms in Malaya, all grown on estates and practically all consisting of the "Deli" strain of *Elaeis guineensis* f. *dura*. The overall average yield was about 15 to 18 cwt. of oil per acre per annum, though many of the



better estates approached 25 to 30 cwt. Research work carried out by the Department of Agriculture is reviewed, and includes manurial and cultural trials and selection and breeding work. Since the war particular attention has been paid to methods of felling old palms and replanting. The results of experiments have in most cases been published elsewhere, but the following may be mentioned here. (1) Comparisons between plants held in nursery beds for 1, 2 and 3 years before planting out showed that the 3-year-old plants suffered too severe a check and subsequently gave relatively low yields. (2) An experiment is in progress to compare several methods of mechanical inter-row cultivation. (3) Evidence is accumulating that oil palms are tolerant of acid soil conditions; in nutrient solution culture trials young palms grew better as the pH value was lowered from 6.5 to 3.5. (4) In selection work two progeny lines E.211 and E.268 have proved significantly higher yielders than the others and E.93 has shown a significantly high percentage of pericarp; certain other lines have proved abnormally susceptible to yellowing and "bronzing". One of the original palms, E.206, has exceptional girth and small annual increments in height; selfed progeny have bred true to these characters. *Cacao*.—In 1947 there were probably only a few hundred cacao trees in Malaya. Since Cheesman's report was published in 1948 [see *H.A.*, 18: 2971] much interest has been aroused and many experiments have been started on methods of establishing cacao, and on vegetative propagation. Twenty preliminary selections have been made from mature Trinitario trees growing on departmental plots, and some material, including Amelonado plants from West Africa, has been imported.

2060. WARDLAW, C. W.

*Armillaria* root and trunk rot of oil palms in the Belgian Congo.

*Trop. Agriculture, Trin.*, 1950, 27: 95-7, bibl. 4, illus.

This disease, caused by *Armillaria mellea*, Vahl, occurs on all soil types but is more serious on poor sandy soils. Infection is by way of the roots from old infected stumps of forest species. The disease has been found on palms up to 10 years old and infected palms are killed very rapidly. Lower leaf bases rot and fall off, and later the whole trunk disintegrates and the leaves collapse. The symptoms may be confused with those of *Fusarium oxysporum* and mixed infections have been found. It is thought that other fungi may also cause the same symptoms. A number of control measures are suggested, including early inspection of plantations and forest clearings, removal of infected leaf bases and badly infected trees, ditching, clean circle weeding and the application of fungicides. C.W.S.H.

2061. PIQUEMAL, A.

La lutte contre *Coelaenomenodera* sp. insecte du palmier à huile à la station principale de La Mé (Côte d'Ivoire). (The control of the oil palm pest *Coelaenomenodera* sp. at La Mé, Ivory Coast.)

*Oléagineux*, 1950, 5: 710-11.

The larvae of a previously unknown *Coelaenomenodera* species caused very severe damage to oil palms by boring galleries under the leaf surface. In trials to control the pest, benzene hexachloride proved very effective against adults and larvae.

## Papaws.

(See also 2179.)

2062. ARNOLD, G. H., AND BAAS BECKING, L. G. M.

Notes on the stem structure of *Carica papaya* L.

*Ann. bot. Gdms, Buitenzorg*, 1949, 51: 199-230, bibl. 3, illus.

A very full description is given of the morphology and anatomy of the stem of the papaya plant. The relation between the morphology and anatomy of the stem is described, and particular attention is paid to the changes in the shape and size of the leaf scar. It is shown that increase in girth is due to the formation of radial walls with subsequent division in the medullary ray cells. C.W.S.H.

2063. KRISHNA MURTI, C. R.

Physico-chemical studies on papaya and Indian gooseberry pectins.

*Proc. Indian Acad. Sci., Sect. B*, 1950, 32: 59-66, bibl. 24.

Highly purified pectin preparations from papaya and Indian gooseberry [*Phyllanthus emblica*] have been shown to form typical metal complexes and to yield polygalacturonic acid, arabinose and galactose on acid hydrolysis. The viscosities of the pectin solutions and the formation of jellies under different concentrations of sugar, acid and pectin were also studied.

## Pineapples.

(See also 2179.)

2064. GAIGNAUX, D.

L'ananas. Considérations écologiques, technologiques et commerciales. Les possibilités de sa culture au Congo belge. (The pineapple. Ecological, technological and commercial considerations. The possibilities of growing it in the Belgian Congo.) [Publ.] *Dir. Agric. Minist. Colon. Brux.*, 1950, pp. 98, bibl. 73, illus., 40 fr.

After an introduction and a historical review, the subject is considered in three parts. Part I discusses the cultivation of the pineapple (ecology, description, varieties, biology, culture, diseases and pests, the possibilities of growing it in the Congo region, the establishment of pineapple plantations in the Belgian Congo, and costs). Part II describes processing, and Part III discusses the economic aspects of pineapple growing in the Belgian Congo.

2065. SERRANO, C., AND NAUNDORF, G.

Algunos datos sobre la propagación vegetativa de la naranjilla o lulo de Castilla (*Solanum quitoense* Lam.) y el enraizamiento de hijuelos de piña (*Ananas sativus* Schult.). (Data on the vegetative propagation of *Solanum quitoense* and the rooting of *Ananas sativus*.) [English summary 4 lines.]

*Not. agron. Palmira*, 1950, 3: 151-3, bibl. 1, illus.

Naranjilla (*Solanum quitoense*), grown almost exclusively in Ecuador, develops very slowly from seed. In

order that it might be grown as an intercrop in plantations of young cacao trees, an attempt was made to propagate it vegetatively from lateral shoots, rooted in frames used for the propagation of cacao. Untreated cuttings completely failed to root, but 90% of the cuttings treated with 2 mg. of the potassium salt of indolebutyric acid in 1 g. talc rooted within 24 days. Basal roots of pineapple, given the same treatment, rooted more rapidly (100% in 14 days) and better (15 roots per cutting) than did untreated roots (50% in 14 days with 3 roots per cutting).—Palmira agric. exp. Stat.

2066. SIDERIS, C. P., AND YOUNG, H. Y.  
**Growth of *Ananas comosus* (L.) Merr. at different levels of mineral nutrition under greenhouse and field conditions. I. Plant and fruit weights and absorption of nitrate and potassium at different growth intervals.**  
*Plant Physiol.*, 1950, **25**: 594-616, bibl. 20, illus., being *Tech. Pap. Pineapple Res. Inst. Univ. Hawaii* 192.

Data on the weight of plants, leaves, stems, peduncles and fruit, and on the concentration of nitrate in the same organs of pineapple plants grown in nutrient solutions in the greenhouse and in soil in the field with different amounts of N, K and Ca are presented in detail and shown in the form of graphs. In the course of the paper, the authors discuss the questions of plant growth and water requirements, absorption of nitrate and potassium, and translocation of nitrate.

2067. SMITH, M. A., AND RAMSEY, G. B.  
**Bacterial fruitlet brown rot of Mexican pineapple.**  
*Phytopathology*, 1950, **40**: 1132-5, bibl. 4, illus.

Primuline yellow bacteria isolated from Mexican pineapples proved to be *Erwinia ananas* Serrano.—Chicago Univ.

#### *Rubber and other laticiferous trees.*

(See also 2111d, p. 2169.)

2068. DE SILVA, C. A.  
**Yields of budded rubber and clonal seedlings in commercial tapping.**  
*Quart. Circ. Ceylon Rubb. Res. Scheme*, 1949 (published 1950), **26**: 26-30+tables.

Replies to a questionnaire received from 94 estates representing over 10,000 acres are examined [see also H.A., 20: 420]. Clone TJ.1, while still the most widely planted and highest yielding of the old clones, is being superseded by clone Prang Besar 86. Clone BD.5 compares favourably in yield with TJ.1, but because of certain disadvantages it is not recommended. Among other clones TJ.16 has proved suitable for drier areas; BD.10 has done well on poor soils; and AV.49, AV.50 and PB.25 seem to be losing popularity. Yield comparisons are made between GL.1, PB.86 and HC.28, and between TJ.1 and TJ.16. Local clones MK.3/2 and WG.6278 have been recommended for the wet low-country districts. The new clones AV.255, PR.107, LUN.N, PB.5/60 and PB.6/50 have shown promise, as have clonal seedlings from the Prang Besar and Tjikadse isolated seed gardens.

2069. PHILLIS, E.  
**On manuring and related problems in rubber.**  
*Quart. Circ. Ceylon Rubb. Res. Scheme*, 1949 (published 1950), **26**: 42-51.

The problems of manuring are discussed and recommendations are made under the following headings: (1) old mature rubber, (2) young rubber not in tapping, and (3) young rubber in tapping.

2070. YOUNG, H. E.  
**Natural resistance to leaf mildew of *Hevea brasiliensis* by clone LCB.870.**  
*Quart. Circ. Ceylon Rubb. Res. Scheme*, 1949 (published 1950), **26**: 6-12, bibl. 5, illus.

The infection of *Hevea brasiliensis* by *Oidium heveae* occurs between bud burst and the time the cuticle matures, which usually takes 18 days. Owing to a very rapid development of the cuticle, this period is considerably shorter with the vigorous clone LCB.870, and the danger of infection is reduced to a minimum. These valuable qualities of resistance and vigour are, however, offset by its low yield, but it seems probable that by using a crown of a clone such as LCB.870 above normal tapping panels the production of these could be increased, and experiments to determine this were started in 1949. Attempts are also being made to produce high yielding resistant clones by cross pollinating clone LCB.870 with high yielding varieties. It is suggested that LCB.870 should also be tested for resistance to *Dothidella ulei*.

2071. YOUNG, H. E.  
**An alternate host of hevea mildew.**  
*Quart. Circ. Ceylon Rubb. Res. Scheme*, 1949 (published 1950), **26**: 13-15, bibl. 5.

In Ceylon early in 1950 *Euphorbia pilulifera* was found to be affected by a species of *Oidium*, morphologically identical with *Oidium heveae*.

2072. YOUNG, H. E.  
**Oidium leaf disease.**  
*Quart. Circ. Ceylon Rubb. Res. Scheme*, 1949 (published 1950), **26**: 16-22, reprinted as *Adv. Circ. Ceylon Rubb. Res. Scheme* **28**: 1950, pp. 6.

*Oidium heveae* was first reported in Ceylon in 1925 and is now firmly established in the main rubber growing areas. The intensity of attack varies from year to year with climatic conditions and is normally very severe at mid-country elevations. Clone LCB.870, imported from Java, is the most resistant variety [see abstract 2070 above]. Trials have shown that while manuring does not prevent the disease, it is valuable in assisting trees to recover from the effects of the mildew. The only method recommended for general control is dusting with sulphur of very fine particle size at a minimum rate of 10-12 lb. per acre every 7-10 days until refoliation is considered complete.

2073. VREEDE, M. C.  
**Topography of the laticiferous system in the genus *Ficus*.**  
*Ann. bot. Gdns, Buitenzorg*, 1949, **51**: 125-49, bibl. 40, illus.

A detailed examination was made of the young stems, petioles and leaves of 58 species of *Ficus*. An account is given of the tissues in which latex cells were found



in the stem. In the petiole the latex cells are continuations of the stalk latex cells. In the leaf the latex cells accompany the veins but branch off to other veins through the palisade cells and spongy parenchyma. Differences between the latex from different species are described.  
C.W.S.H.

### *Sugar cane.*

(See also 1600, 2111j, 2161, 2179, 2181.)

2074. ROBBINS, W. T.

**Cane growing in Australia: some reflections on current practice.**

*S. Afr. Sugar J.*, 1950, 34: 805-15, illus.

The author, a member of the South African Sugar Association's delegation to the 1950 International Congress at Brisbane, reviews various aspects of the Queensland industry, including its administration, the area of farms, the standard of agricultural performance, the high rate of harvesting per unit of labour, payment for cane, and cane costs and values. A tabulated comparison is made between field performance in Queensland and Natal for 1947 and 1948.

2075. ANON.

**Sugarcane research in Mauritius.**

*Nature*, 1951, 167: 188-9, illus.

The article briefly describes the importance of the Sugarcane Research Station to the industry in Mauritius with references to work on breeding (M.134/32), the foliar diagnosis of mineral deficiencies, weed control and the relation between root vigour and resistance to damage by *Clemora smithii*.

2076. HOCKETT, R. C.

**Sugar: The foundation of life. "Natural" and refined sugars: their chemistry and biochemistry.**

*S. Afr. Sugar J.*, 1950, 34: 579-91.

Although essentially a popular article covering many aspects of sugar from its early history to its biochemistry, this paper provides a good deal of interesting and useful information, including tabulated data on the relative efficiencies in calorie production of various agricultural products, the sugar contents of various fresh and dried fruits, vegetables and nuts, and details of the composition of, and vitamins in, raw sugar and molasses.—Sugar Research Foundation, N.Y.

2077. CALMA, V. C., AND RAMOS, F. V.

**An outstanding introduced variety of sugar cane.**

*Philipp. Agric.*, 1950, 33: 190-6, bibl. 1.

A variety of sugar cane, introduced in 1939 and referred to as College 39 because the original record of its name was lost in the war, has given outstanding results as a plant crop at the College of Agriculture by comparison with P.O.J.2878, P.S.A.7 and P.S.A.14.

2078. YAMASAKI, M., AND MORIYA, A.

**Polyploidy and the size of stomata in the sugar-cane.** [Japanese.]

*Bot. Zool.*, 1939, 7: 1069-72, illus., from abstr. in *Jap. J. Bot.*, 1940, 11: (43) [received 1950].

It is shown that a comparison of the length of the stomata makes it possible to distinguish easily between diploid and allopolyploid strains of sugar cane.

2079. GONDO, A., AND TAKAHASHI, M.

**Pollen studies of sugar-cane I. Pollen germination in culture media 1.** [Japanese, English summary.]

*Jap. J. Genet.*, 1939, 15: 194-208, illus., from abstr. in *Jap. J. Bot.*, 1940, 11: (4)-(5) [received 1950].

The addition of boric acid to the agar+sugar nutrient medium increased the germination of sugar cane pollen and reduced the amount of bursting, an addition of  $3 \times 10^{-6}\%$  being the most effective. The use of a nutrient medium containing  $\frac{1}{10}$  mol. sucrose and 0.5% agar gave the highest germination rate and the lowest bursting rate. The most favourable pH value for germination was 5.2 to 6.4, that for pollen-tube growth being slightly higher.

2080. KIHARA, H., AND IMAMURA, S.

**The relationship between the flowering period of sugar cane and day length.** [Japanese.]

*Z. Inst. Genet. landw. Abt. Kais. Univ. Kyōto*, 1941, 1: 3-5, from abstr. in *Jap. J. Bot.*, 1943, 12: (44) [received 1950].

As the time of flowering in sugar cane varies in different parts of the world, even when the temperatures are very similar, it is concluded that flowering must be dependent on day length. It has been observed that flowering occurs soon after a day length of 12½-12¾ hrs. is reached; in Java, for instance, it is immediately after such a photoperiod, in Saipan 2 weeks after, and in Hawaii 6 weeks after.

2081. YAMASAKI, M., AND ARIKADO, H.

**Seasonal variation of carbon assimilation in sugar cane.** [Japanese.]

*Proc. Crop. Sci. Soc. Japan*, 1942, 13: 313-15, from abstr. in *Jap. J. Bot.*, 1943, 12: (69) [received 1950].

The intensity of carbon assimilation of sugar cane in Formosa, as measured by the weight of assimilates, was found to be at a maximum in September, when flower bud formation occurs. It is thought that the two processes may be related to one another.

2082. VAN DILLEWIJN, C.

**Tillering of cane.**

*Sugar J.*, 1950, 13: 5: 38-48, bibl. 36, illus.

The literature on the tillering of cane is reviewed and many diagrams and illustrations are reproduced. The mode of tillering is considered for varieties of *S. officinarum* and *S. spontaneum* and formulae used to describe the mode in each case are illustrated. The climatic factors which affect tillering are, in order of importance, light, temperature, and moisture. Other factors which can exert an effect are fertilizers, spacing, diseases and pests, thinning, time of planting, and the power of cane varieties to compensate for gaps in the field. The influence of each of these factors is discussed.

2083. BAKER, M. S.

**Overhead irrigation.**

*Sugar J.*, 1950, 13: 5: 50-2, illus.

A method of overhead irrigation tested at Aguirre, Puerto Rico, is described. Much of the land in the area is too uneven and water too scarce to permit adequate furrow irrigation. Pipes were laid at 44 in., and these fed sprinkler nozzles mounted on "Risers"

12 ft. high, there being 31 "Risers" to the  $7\frac{1}{2}$  acres covered. The overhead system showed an efficiency of 77% compared with about 50% for gravity systems, which in this case meant a saving of 24 in. of water. Compared with previous years the yield of cane was nearly doubled. Nitrogenous fertilizers and chemicals for weed and insect control were applied through the system with success.

2084. KING, N. J.

Soils investigations in the sugar-cane producing areas of Bundaberg.

*Qd J. agric. Sci.*, 1949, 6: 141-76, bibl. 2, map, reprinted as *Tech. Commun. Qd Bur. Sugar Exp. Stats* 3.

Three major soil series—designated the Woongarra, the Gooburrum and the Burnett series—and an unusual minor type (Kepnock Yellow Soil) have been recognized following a survey of the Bundaberg district cane-growing areas. The chemical and physical properties of the various series and their component types are described. Soil moisture relationships, as deduced from standard determinations and a series of field investigations, are described for the major types and the suitability of the soils for irrigation purposes is discussed. The nutrient status of each type is considered in relation to chemical analysis and the results of field fertilizer trials. Results of some trials with molasses and other soil amendments are given. [Author's summary.]

2085. DU TOIT, J. L.

Growth-rate method for determining fertiliser requirements of sugarcane.

*Proc. 24th annu. Congr. S. Afr. Sugar Tech. Ass.*, 1950, pp. 83-9, bibl. 1, reprinted in *S. Afr. Sugar J.*, 1950, 34: 523-32.

The growth-rate method of determining fertilizer responses in sugar cane, which was proposed by Evans,\* has been tested out at the Experiment Station [Mount Edgecombe]. After preliminary experiments the method was altered and standardized to suit our conditions. The quantities of fertilizer used have been increased and the randomized block design based on initial increments is now used. The results are obtained by a statistical analysis of the increments in growth after fertilizer application. About 30 experiments have been completed. In general there was good agreement between field trials and this rapid technique where such comparisons were made. Apparent contradictions could be explained after further investigations. Leaf analyses done on some of these tests proved instructive. Certain correlations found between nitrogen per cent. leaf as well as the nitrogen/phosphate ratio and nitrogen response are given. The method is considered a useful tool in research and the results can also be applied directly in the field. [Author's summary.]

2086. JEX, W. F. C.

The maintenance of soil fertility. Trash conservation and fertilisers: higher yields and lower costs.

*S. Afr. Sugar J.*, 1950, 34: 507-9.

Evidence is accumulating that soil fertility under cane can best be maintained by a combination of a trash

\* Evans, H. *Ann. Bot.*, 1942, 6: 413-36, bibl. 2.

blanket and adequate fertilizer applications from the end of the plant crop onwards. Cultivation, with consequent exposure of the soil, is thus limited to the establishment of the plant crop. The presence of open drains causes no inconvenience, though the introduction of mechanized harvesting may eventually necessitate their replacement by tile drainage.

2087. BEAUCHAMP, C. E.

Effects of 2,4-D on sugar content of sugar cane.

*Sugar J.*, 1950, 13: 5: 57-72, bibl. 1, and 13: 6: 20-30.

A series of experiments made in Cuba in 1948 and 1949 is described in which the sodium salt of 2,4-D was applied as a dust at 4 to 10 oz. acid equivalent per acre to sugar cane shortly before harvest. The main varieties involved were Media Luna 3/18 and P.O.J. 2878. It was found that when the 2,4-D was applied to the foliage after the rainy season had ended or after the last irrigation had been applied the sugar content was increased by an average of slightly more than 1% on a basis of cane weight. The increase occurred immediately after application of the hormone and reached a maximum in about 10 days. It was due to an increase both in purity and Brix of the juice. For treatment to be successful it proved essential that the plants should not be suffering from drought or lowered vitality. There were differences in the duration of the response under different environmental conditions, but in some cases it lasted for 30 to 40 days after treatment. There was also some evidence of a difference in response between varieties.

2088. LOUSTALOT, A. J., CRUZADO, H. J., AND MUZIK, T. J.

The effect of 2,4-D on sugar content of sugar cane.

*Sugar J.*, 1950, 13: 5: 78.

In a trial at Mayaguez, Puerto Rico, the variety M.336 was sprayed with 0.2% of the isopropyl ester of 2,4-D at 90 gal. per acre. Some of the cane was harvested 11, and some 25, days after the application. The treatment had no effect in increasing the sugar content; in fact, the sugar content of juice from untreated cane was slightly, though not significantly, higher than that from treated cane.

2089. WILSON, G.

Frenchi grub control in north Queensland.

*Cane Grs' quart. Bull.*, 1950, 14: 69-72, bibl. 2, illus.

In preliminary trials third stage frenchi larvae [*Lepidiotia frenchi*] were successfully controlled by applications of 150 lb. of 10% BHC (1.3% gamma BHC) made in half open drills when plant cane was about 2 ft. high. The plant canes showed no visible damage from first and second stage larvae. In the first ratoon crop no damage was still evident in the treated plots, but most of the untreated plots were totally destroyed by third stage larvae.

2090. MUNGOMERY, R. W.

Control of the "greyback" cane grub pest, *Dermolepida albohirtum* Waterh., by means of "gammexane" (benzene hexachloride). *Tech. Commun. Qd Bur. Sugar Exp. Stats* 4, 1949, pp. 107-28, bibl. 12, illus.



This is a full account of the work that has been carried out in Queensland since 1945 to determine the effect of seasonal and soil conditions and time and method of application on the efficacy of gammexane treatment, the minimum effective dose, and the phytotoxicity of the material. The results have been summarized in *Cane Grs' quart. Bull.*, 1950, 13: 160-4 [see *H.A.*, 21: 1162].

2091. DICK, J.

**A third series of insecticide tests against the elegant grasshopper.**

*Proc. 24th annu. Congr. S. Afr. Sugar Tech. Ass.*, 1950, pp. 95-8.

In laboratory tests hoppers of the elegant grasshopper, *Zoncerus elegans* Thnb., were killed by dusting with Bexadust which contains 5% technical BHC, Aldet which contains 5% DDT+2.5% technical BHC, and Thiosphos, a powder containing 1% parathion. Bexadust exposed to the atmosphere for 2 months still gave 95% to 100% kill, but another make of BHC 2% powder, which gave only 50% to 60% kill when fresh, became almost completely ineffective after 2 months' exposure. It is thought probable that this material contained a lower content of the gamma isomer than was claimed for it.

2092. GUPTA, B. D.

**Some recommendations on the control of termites in sugar-cane.**

*Curr. Sci.*, 1950, 19: 344-5.

Good control of termites in newly planted cane has been obtained by dipping the setts in solutions of either lime and lead arsenate, "phenyle", mercuric chloride, or DDT. Applications of 5% BHC dust to the furrows before planting has also given good results.

2093. BAIRD, E. W.

**The commercial production of green manure seed in the Cairns hinterland.**

*Qd agric. J.*, 1950, 71: 143-53, illus.

Leguminous green manure crops are used extensively in rotation with sugar cane in Queensland, and commercial seed production is practised in the relatively dry Cairns hinterland. The main legume seeds produced are those of 4 varieties of cowpea, namely giant cowpea, Groit cowpea, Cristaudo pea and Reeves Selection. Two other legumes produced in some quantity are velvet beans, particularly the varieties Somerset, Jubilack and Black Mauritius, and Gambia peas. Notes are given on the cultivation of these legumes, their yields and the control of pests and diseases.

*Tea.*

(See also 2111h, i, k, l, m, 2120, 2176.)

2094. VAN WEZER, A.

**Een nieuwe cultuur in Kivu: thee. (Tea as a new crop in Kivu.)**

*Cult. Hand.*, 1950, 16: 310-11, illus.

A plea for the extension of tea-growing in Kivu (Belgian Congo) with notes on climatic requirements, soil, seedbeds, cultivation operations and planting, pruning, and plucking. Diagrams show degrees of plucking.

2095. SPRINKS, F. O.

**Some aspects of tea planting in Mauritius.**

*Rev. agric. Maurice*, 1950, 29: 270-7.

For various reasons the average yield from over 2,000 acres of tea in Mauritius is still very low. In 1949 it amounted to 328 lb. made tea per acre, while in the author's view an average of 800 lb. could be achieved if better methods were adopted. The recommendations made in this article are based on results obtained at the Experimental Station and on observations by the author. These suggestions refer to land clearing, planting, windbreaks, plucking, pruning, soil management, manufacture and labour.

2096. LAYCOCK, D. H.

**Bringing young tea into bearing.**

*Nyasaland agric. quart. J.*, 1950, 9: 5-8.

Six treatments for bringing young tea into bearing were compared. In five treatments the tea was brought into plucking during the second year after planting the stumps, but in the sixth treatment the bushes were allowed to grow for 2½ years before pruning and beginning to pluck. This treatment gave the lowest aggregate yield over the first four plucking seasons and the method is not recommended. In four of the other treatments, the bushes were cut across at heights varying from 8 to 16 inches at 18 months old, after which different methods of up-pruning and tipping were employed. The remaining treatment consisted of lightly plucking from 9 months onwards and pruning at 30 months. This last treatment gave the highest yield, but is not considered practicable owing to the low plucking standards of local labour. The bushes cut across at 16 inches at 18 months, plucked at 27 inches and up-pruned, after 2 years' interval, 2 inches annually, gave almost as high a yield, and the method is considered more practical. The ultimate yield of mature tea was about the same in all cases.

C.W.S.H.

2097. PORTSMOUTH, G. B.

**Crop protection during recovery from pruning.**

*Tea Quart.*, 1950, 21: 11-16, illus.

As a result of the spraying experiments described for the control of blister blight, it is concluded that spraying with a copper fungicide on 7 day rounds, regardless of weather conditions, can provide satisfactory protection for tea recovering from pruning during the south-west monsoon.

2098. LOOS, C. A.

**Crop protection during plucking.**

*Tea Quart.*, 1950, 21: 16-21.

Returns from crop protection experiments (blister blight) are tabulated and discussed which show the increase in yield as a result of spraying with Perenox at intervals of 9-10 days.

2099. SCOLES, C. L.

**The application of crop protection methods.**

**Part I. Wet spraying.**

*Tea Quart.*, 1950, 21: 22-7.

An account is given of equipment, organization in the field, labour, supervision, spraying technique, effects of weather, and application recommended, for spraying against blister blight. It is concluded that low-volume

spraying with Perenox gives thoroughly reliable protection.

2100. HAWORTH, F.

**The application of crop protection methods.**

**Part II. Dusting.**

*Tea Quart.*, 1950, 21: 27-8.

Experiments described start at dawn, areas below roads and paths being dusted using the downward air current. This persists until about 6.30 a.m. when conditions become confused due to the sun rising and, in general, dusting must be stopped for about an hour. After this interval the general convectional trend is up the slopes and, using this air current, the areas above the roads and paths are dusted. By about 10 a.m. on most days the leaves are dry and the upward convection currents are so intense that, generally speaking, dust cannot be applied satisfactorily.

2101. HAWORTH, F.

**Crop protection by copper fungicides. Part**

**I. The effect of weather on copper residues.**

*Tea Quart.*, 1950, 21: 28-32.

From the observations recorded it is concluded that if spraying against blister blight is carried out immediately after plucking, using the recommended amounts of fungicide, the copper content of the made tea should be less than 100 p.p.m. even under dry conditions. Teas made from areas dusted under typical south-west monsoon conditions can be expected to have copper contents below 80 p.p.m., provided that the interval between dusting and plucking is about 7-8 days.

2102. LAMB, J.

**Crop protection by copper fungicides. Part**

**II. Copper residues in relation to quality.**

*Tea Quart.*, 1950, 21: 33-5.

The copper content of the sprayed tea, and its implications, are discussed.

2103. WALTER, T. E.

**Crop protection by modified agricultural**

**methods. Part I. The control of shade.**

*Tea Quart.*, 1950, 21: 35-7, bibl. 1.

Shade trees on tea estates are discussed with particular reference to "shade control" for reducing the incidence of blister blight. The only permissible method of effecting shade control is by lopping, except with old trees of *Albizzia moluccana* which should be cut down and replaced. The two basic principles on which the growing of this species should depend are a 10-year rotation (approximately), and an uneven-aged stand.

2104. LOOS, C. A.

**Crop protection by modified agricultural**

**methods. Part II. The Kataboola loss of**

**crop experiment.**

*Tea Quart.*, 1950, 21: 38-40.

Two forms of agricultural control of blister blight have been tested: (1) shortening the plucking rounds, and (2) hard or fish leaf plucking. The closing up of rounds appears to be entirely ineffective as an anti-blister blight measure under conditions of leaf attack only, but the value of fish leaf plucking during conditions of severe stem attack appears certain.

2105. PORTSMOUTH, G. B.

**Crop protection by modified agricultural**

**methods. Part III. General considerations.**

*Tea Quart.*, 1950, 21: 41-3.

Mention is made of a proposed tipping experiment, and plucking is discussed. It was found in one small-scale experiment that fish leaf plucking not only reduced the incidence of blister blight markedly but also increased the yield. Planters are advised to keep the soil in "good heart" by the use of green manure, compost, etc., and to apply the right quantities of artificial fertilizers to produce vigorous healthy bushes.

2106. LAMB, J.

**Crop protection by wet spraying compared with crop protection by dusting.**

*Tea Quart.*, 1950, 21: 44-7.

A comparison is made of costs and efficacy of the two methods. Wet sprays have proved to be effective, but before taking large-scale risks with dusting, information must be obtained on the areas over which dust may be evenly distributed during south-west monsoons, on whether a concentration of 2% copper in the dust is sufficient, and whether longer intervals between applications, or shorter intervals and lower rates of application will ensure the better protection.

2107. SIMURA, T.

**Studies on the relationship between cold hardiness and red tea disease resistance in tea.** [Japanese, Esperanto summary.]

*Proc. Crop. Sci. Soc. Japan*, 1941, 13: 5-19, from abstr. in *Jap. J. Bot.*, 1942, 12: (25)

[received 1950].

Tea plants from India are generally resistant to red tea disease, caused by *Guignardia camelliae*, but have little resistance to cold, while with those from Japan the reverse is the case. Chinese species are intermediate in both respects. Tannin content of the leaves is correlated positively with resistance to the disease and negatively with resistance to cold. The optimum temperature for the development of the fungus is 27°-30° and it does not occur in cold districts. It is therefore concluded that strains of tea rich in tannin will be most suitable for moist, warm regions, and strains poorer in tannin, such as green tea, for cold regions.

### Other crops.

(See also 2065, 2111q, 2188.)

2108. NARAYANAMURTI, D., RANGANATHAN, V., AND GEORGE, J.

**Studies on building boards. Part I. Utilization of areca-nut husk.**

*Indian For. Leaflet. For. Res. Inst., Dehra Dun* 112, 1948, pp. 7 [received 1951].

An analysis of husks of the betel nut palm (*Areca catechu*) is given. It has been found that good quality insulating wool can be prepared without chemical treatment. Boards comparing favourably with foreign products have also been prepared by various processes. Results of tests on the boards for strength, thermal properties, and moisture absorption and swelling are tabulated.

2109. RICHARDS, A. V.

**A note on the cultivation of Singapore jak.**

*Trop. Agriculturist*, 1950, 106: 12-13.

The Singapore jak is an early-bearing variety of the ordinary jak, *Artocarpus heterophyllus* Lamk., and



should not be confused with the Johore jak, *A. champe-den*. Under favourable conditions the Singapore jak comes into bearing in about 18 months. Seed, if sown fresh, can be germinated successfully in pieces of coconut husk containing enough soil to cover the seed. Seedlings can be budded by the modified Forkert method, but transplanting is difficult. Notes are given on planting out, spacing and protection of the fruit against the jak borer (*Margaronia caesalis*). After harvesting, the stalk should be cut flush with the stem to encourage the production of further flowering shoots.

2110. GARESE, P.

Formación de raíces por acción hormonal.  
(Induction of rooting [in Yerba maté] by hormone treatment.)

*Idia*, 1950, 3: 25/27: 10.

Owing to the heterogeneity of seedlings, plants of Yerba maté, *Ilex paraguariensis*, vary greatly in caffeine content. It would therefore be of considerable value if the species could be propagated vegetatively and clones of a high caffeine content established. Trials were carried out at the Institute of Botany, Buenos Aires, and the Loreto Station of Agricultural Research to determine whether treatment with growth substances would induce the rooting of cuttings. Nine growth substances were tested, the immersion and dip methods being used. The results were promising, 2,4-D,  $\alpha$ -naphthaleneacetic acid and ortho-chloro-phenoxy-acetic acid resulting in 24%, 16% and 15% rooting, respectively.

*Noted.*

2111.

a ANON.

Coffee husk as cattle feed.

*Indian Coff. Bd mon. Bull.*, 1950, 14: 227-8.

b AUTUORI, M.

Investigações sobre a biologia da saúva.  
(Studies on the biology of the leaf-cutting ant [*Atta* spp.] )

*Ciênc. e Cult.*, reprinted in *Bol. Super. Serv. Café, S. Paulo*, 1950, 25: 430-9, illus.

c CHEESMAN, E. E.

Classification of the bananas. III. Critical notes on species. r. *Musa borneensis* Baccari. s. *M. violascens* Ridley and *M. gracilis* Holtum.

*Kew Bull.*, 1950, No: 2, pp. 151-5, illus.

d COLLING, R. H.

A plan for replanting rubber with the minimum loss of crop.

*Quart. Circ. Ceylon Rubb. Res. Scheme*, 1949 (published 1950), 26: 23-5.

e FILHO, H. A.

Experimentação cafeeira em Kenia. Revisão de literatura. (Coffee research in Kenya. A review of the literature.)

*Bol. Super. Serv. Café, S. Paulo*, 1948, 23: 86-90, bibl. 4 [received 1950].

f FILHO, H. A.

O melhoramento do café em Java. Revisão de literatura. (Improvement of coffee in Java. A review of the literature.)

*Bol. Super. Serv. Café, S. Paulo*, 1948, 23: 595-8, bibl. 6 [received 1950].

g GARNETT, C. B.

A short history of coffee growing in Nyasaland.

*Nyasaland agric. quart. J.*, 1950, 9: 1-5.

h G[LOVER], P. M.

Recipes for sprays which can be prepared home made on the [tea] garden.

*Serial Tocklai* 33/1, 1950, pp. 3.

i HARLER, C. R.

The drying of tea. A survey of the development of the firing process.

*Nyasaland agric. quart. J.*, 1950, 9: 9-25, bibl. 6.

j KING, N. J.

The evolution of the cane planter.

*Cane Grs' quart. Bull.*, 1950, 14: 47-54, illus.

k KURSANOV, A., VOROBEJEVA, M., AND VYSKREBENCEVA, E.

m-inositol in tea leaves and its method of formation. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1949, 68: 737-40, bibl. 8 [received 1951].

l LAMB, J.

The blister blight control campaign [in Ceylon].

*Tea Quart.*, 1950, 21: 4-7.

m NEWTON, G. K.

Blister blight: proprietors' views.

*Tea Quart.*, 1950, 21: 7-10.

n PERKINS, J. F.

The Kenya coffee "industry".

*Mon. Bull. Coffee Bd Kenya*, 1950, 15: 481-2.

The economic aspects of coffee production are discussed.

o PERUR, N. G.

Cacao bean husk as a cattle feed.

*Poona agric. Coll. Mag.*, 1950, 41: 129-30.

p PHILLIS, E.

The future of the natural rubber industry in Ceylon.

*Trop. Agriculturist*, 1949, 105: 59-63 [received 1951].

q SCHLESINGER, W., AND LEEPER, H. M.

Polymers from chicle.

*Science*, 1950, 112: 51-2, bibl. 7.

r SCHWEIHEIMER, W.

O café como medicamento. (The medicinal value of coffee.)

*Bol. Super. Serv. Café, S. Paulo*, 1950, 25: 340-2.

## NOTES ON BOOKS AND REPORTS.

## Books.

## 2112. ACERETE, A.

Frutas y verduras congeladas. (Frozen fruits and vegetables.)

*Bol. Estac. exp. Aula Dei* 6, 1950, 8½ × 6 in., pp. 163, bibl. 78, illus., 55 pesetas.

This review of the methods and effects of quick freezing, based on literature from all parts of the world, contains tables showing the nutritional value of various fruits and vegetables, data on the effects of freezing on vitamin content, and a chapter on the industrial methods used for freezing individual crops, in some cases with mention of the most suitable varieties.

## 2113. BAGENAL, N. B.

*The fruit grower's handbook.*

Ward, Lock, London, 1949, 7½ × 5½ in., pp. 288, illus., 10s. 6d.

Bagenal's *Fruit growing* (H.A., 15: 2061) has proved a valuable textbook for all interested in the growing of fruit; it is, however, expensive and contains information on some of the less usual aspects and kinds of fruit growing. *The Fruit Grower's Handbook*, at less than a third of the price, has successfully managed to include most of the essential information given in the original work, with the omission of those sections that deal with exhibiting fruit, and growing fruit under glass and in pots. Cider apples, grapes, bullace, hazel nuts and filberts have also been dropped out, but all the main crops grown are included with little abridging. Some of the cuts made may seem rather haphazard: for instance in the descriptions of varieties a useful variety such as Allington Pippin is omitted and a worthless one such as Mr. Gladstone retained. Some odd things have happened in this shortening; thus Lady Sudeley no longer appears in the descriptions of varieties although it is still given in a table showing the order of ripening of "some good varieties", and Wellington, listed as one of the "best flavoured" cooking apples, has been cut out of the descriptions. Examples of such lapses are numerous. The revised information given on pest and disease control does not appear to be completely up to date, even for 1949, but the spray calendar is for the most part more correct than the general descriptions. It is a pity that more revision could not have been done to improve weaknesses existing in the original book. Thus the pollination of cherries could have been slightly expanded with advantage; the very brief information given might well lead to the planting together of the mutually incompatible varieties Early River's and Knight's Early Black, on the grounds that they are listed as flowering together. The treatment of the pollination of pears is also unsatisfactory, especially in listing certain varieties as self-fertile whereas, in fact, no diploid or triploid pear will set a satisfactory crop with its own pollen. The reduction in the number of photographic illustrations from 60 to 30 and of coloured plates from 8 to 1 affects the usefulness of the book very little, and practically all the text figures have been retained.

H.B.S.M.

## 2114. BEAN, W. J.

*Trees and shrubs hardy in the British Isles. Vol. I.*

John Murray, London, 7th edit., 1950, 8½ × 5½ in., pp. xviii + 703, bibl. 3 pp., illus., 42s.

Bean's *Trees and Shrubs*, to give the book its colloquial appellation, was first published in 1913 and at once took its place as the authority on all matters relating to the description, habits and cultivation of woody plants hardy in the British Isles. Many books on trees and shrubs were already in the field, for gardeners, like retired generals, seem to find it impossible to stop writing, but so far none had attempted to deal, or at least succeeded in dealing, with all the species known to have been grown without protection in this country. This Bean achieved, and it must account in part for the favour with which the book was received and for its ever increasing popularity. Between 1913 and 1933 so many new species had been introduced and so much knowledge gained about plants new to cultivation that it was found necessary to publish a third volume to deal with the new material. All this has been incorporated in its proper place in the new edition, and certain plants hardly only in the milder parts of the British Isles have been included. The volumes are embellished by a series of new and really excellent plates. The arrangement of genera and species throughout the book is alphabetical, the present volume concluding with *Exochorda*. Two further volumes are to follow. Besides the plates there are many line drawings in the text, but even so not nearly enough. It would have been pleasant if a line drawing could have been provided of a representative from each genus as a starting point in the process of identification; for to the uninitiated (and to those more instructed) even an indifferent illustration, and these are remote from that, can convey more than the most meticulous description. That, however, is a counsel of perfection. In addition to the descriptive notes forming the main body of the book there are 24 chapters in which all aspects of general cultivation are discussed. Some of these contain lists of plants for unfavourable environments such as streets, seaside, or damp places, and of those possessing some decorative character other than their flowers. Handsome bark, coloured foliage, large foliage, decorative fruits and other such classified lists will prove useful to those concerned with the ornamental aspects of gardening, as will the notes on the most effective placing and management of the various types. The advent of the remaining volumes will be eagerly awaited.

G.St.C.F.

## 2115. BREVIGLIERI, N.

*Peschicoltura. (Peach growing.)*

*Trattati di Agricoltura*, Vol. 11, Ramo editoriale degl' Agricoltori, Rome, 1950, 10 × 6½ in., pp. 590, bibl. numerous, illus., 3,000 lire.

This book, a valuable addition to our knowledge of peaches and peach growing in the open, is compiled by a professor of fruitgrowing at the University of Florence. It is the first of its kind published in Italy and



so fills a gap in the horticultural literature of that country. The story of peach growing in Italy is lost in the "night of time", but it is only in the last fifty years that peaches have become important enough for their cultivation to become one of the chief national industries. Two important works on peaches are Hedrick's *The Peaches of New York*, 1917, illustrated by many magnificent plates, and a recent monograph by Caillavet and Souty [*H.A.*, 20: 3394], but these are chiefly devoted to nomenclature and descriptions of varieties, while in the Italian book varietal descriptions are confined to one chapter and other aspects of peaches and peach growing receive detailed attention. Its 25 chapters contain historical data (particularly the early history of the peach in Italy), classification with botanical and pomological descriptions, genetics and the improvement brought about in various countries by breeding, sexual reproduction and propagation of clones, rootstocks and compatibility, descriptions of varieties (chapter 10, pp. 165-219, with many photographs and 2 coloured plates), cultural operations (budding, manuring, irrigation, pruning, thinning the fruits), costs of production, parasites and diseases, harvesting the crop, storage, drying and canning. Numerous references appear as footnotes on the relevant pages, and indexes are supplied of both authors and varieties. The book is fully illustrated throughout, and its general appearance is attractive. The paper binding, however, is insufficient for a work of this size and quality. The author himself has written many original articles on various aspects of peach growing and it is evident that he has made a careful and detailed study of his subject. The book is one to be consulted by all who are interested in outdoor peach cultivation.

H.W.

2116. COLVIN, B., TYRWHITT, J., AND BADMIN, S. R.

*Trees for town and country.*

Lund Humphries, London, second edition, 1949, 11 x 9 in., pp. 132, bibl. 10, illus., 25s.

This beautifully produced book, compiled for the Association for Planning and Regional Reconstruction, will clearly be of value to the landscape architect and others who may now be responsible for planning our parks and new towns. Although "windscreens" are mentioned, the reference is intended to apply to the protection of housing and not to their use in agriculture. In fact the use of trees on farms is mentioned only in so far as some of them are suitable for hedgerows and others for planting in meadows.

Altogether sixty species are described, each with a full-page photograph. The descriptions are very brief and consist of terse notes on planting, growth, soil and climatic requirements and habitat. Each description is accompanied by excellent line drawings, by S. R. Badmin, of the tree at different ages set against a scale to show its size, and of certain parts of the tree such as its flowers and fruit. Where the drawings include illustrations of foliage, flowers and fruit, their clarity might make them valuable for identifying trees, but the details presented in this way are not always complete. With catalpa, for example, the characteristic pods are not shown, and similar omissions occur with several other species.

It is a pity that the text could not have been rather more

comprehensive; methods of propagation, for instance, are briefly mentioned in only a few instances. There are also some curious omissions, notably the copper beech which is merely mentioned as a suitable companion for the acacia. Reference early in the introduction to the health value of trees "in purifying the atmosphere" may perhaps be regarded as poetic licence.

Apart from these few faults, which it would not be difficult to correct in future editions, the book will be of interest to many people who, though neither landscape architects nor town planners, derive great pleasure from trees and from looking at beautiful photographs and drawings of them.

H.B.S.M.

2117. FAULKNER, R. P.

*Simple gardening.*

Collingridge, London, 1950, 7 x 5 in., pp. 160, illus., 6s.

This small book, as the title indicates, does not attempt to reveal the mysteries of the Higher Gardening but confines itself to providing some of the lower rungs of the ladder whereby they may eventually be reached. Those not aspiring to the heights but requiring a sound grounding in the essentials of cultivation will find the book entirely adequate. As a current inescapable advertisement has it, the ideal is "not too little, not too much", and this reasonable advice has not been disregarded here. But, brief though it is, there are few garden matters which escape attention. On the construction side, planning, planting and lay-out, and the making of ponds and rock gardens receive quite adequate mention. The twenty-five pages on the outdoor cultivation of vegetables tell all that is necessary for success with the kinds usually grown. The care of hardy fruits is sufficiently explained. There is no mention of budding or grafting, for there would be little scope for these arts in a small garden. In fact, propagation of any kind except by seed is little noticed. The flower garden comes in for most attention. Short lists are provided of suitable plants for various situations, bedding, borders, etc. They are intended to give the beginner a lead, expecting him, as he progresses, to range further afield. There are some useful illustrations of cultural operations.

G.St.C.F.

2118. FOLLEY, R. R. W.

*Economics of a fruit farm.*

Oxford University Press, London, 1951, 9 x 5½ in., pp. 103+17 graphs, 12s. 6d.

This admirable book continues the good work started by O. G. Dorey with *The Fruit Farm* (Faber, 1949); like Dorey's book, it is the story of a fruit farm expressed in economic terms, but it is concerned only with apples. The new work, however, has the advantage of dealing with a much longer period, 1932-1948, and carries the story to a later date. This means that the economic history runs to the point of mature bearing, and also into a period when the market for apples was freed. The story is unfolded of the planting and cropping on an unnamed fruit farm with remarkable clarity, and the author has obviously been in very close touch with the farmer throughout. From time to time the severity of the economic account is admirably lightened by quotations of the grower's own words.

Mr. Folley first sketches the economic history of apple growing, and shows, for instance, that even during the

depression of the thirties apple prices were relatively higher than general prices. After describing the cost of establishing 86 "fruit acres", he introduces an important concept, the "point of establishment" at which the income catches up with expenditure. This point was in 1939, the seventh year, though it might have been the sixth but for a crop failure in 1938. The cost up to this point had been £156 per acre, half in providing land, trees, equipment and buildings and half in sprays, fertilizers and labour. A decision by the farmer to concentrate on choice dessert apples led to the grubbing or re-working of some 4,000 trees of other varieties of apple. In the final stage, the area was producing a revenue of just over twice the outgoings. The valuation is shown at cost, replacement cost and market value, though unfortunately no attempt is made to put a figure on this last item.

The enterprise was financed up to 40% by the Agricultural Mortgage Corporation and the rest by private capital, but we are not told the rate of interest, nor in the account is any interest charge made for private capital. A useful table is given on the capital sums required, both in amount and time for the years up to establishment. Other salient points dealt with in economic terms are: (i) The great risk frost could be, even though the site was a good one; up to £25 per acre could profitably be spent on prevention. (ii) The big cash value per acre of high grade dessert fruit, and the proportionally low charges for grading and marketing. (iii) The need for intensive production in view of rising labour costs. This study shows high returns to the production of choice dessert apples by this particular farm; but this does not mean that in another district as high or higher returns would not be obtained by culinary apples, or that a grower is not taking an unwarranted risk if he depends too much on the market always wanting fancy grade Cox's. The story is summarized in an admirable series of graphs in Part II. This book, which is well printed and presented, is one which no fruit grower, established or beginner, should neglect.

F.G.O.

## 2119. FOX WILSON, G.

**Pests of flowers and shrubs.**

*Bull. Minist. Agric. Lond.* 97, revised 1950,  
9½ × 6 in. H.M. Stationery Office, pp. 105,  
illus., 4s. 6d.

This well-illustrated account of the insects that attack flowers, trees and shrubs, first published in 1937, has brought together information that was in many cases slight and was certainly scattered. As entomologist to the Royal Horticultural Society, the late Mr. Fox Wilson had both the experience and the background necessary for the preparation of the bulletin, and it has remained one of the standard works on the subject. It has now been revised and brought up to date and, with the comprehensive index, it occupies 105 pages and has 118 drawings and photographs.

The author first gives a short introductory account of insects and related creatures and then defines the principles of pest control. He covers cultural, mechanical, and biological methods and deals fairly fully with control by means of insecticides. The pests are described in detail. The account of general pests includes the biology and habits of slugs, wireworms, leatherjackets and other soil creatures that are

continually troublesome to many garden plants. The section that deals with pests of lawns, roses, herbaceous borders and other special garden groups, including shrubberies and greenhouses, is of particular interest. The text is both informative and readable. The illustrations deserve special praise for their photographic excellence, much of which has been retained in the reproduction. It should be noted that Fig. 39, used as an illustration of rose slugworm, is misleading because the insects represented are pear slugworms on a pear leaf. As a new attempt at representing an insect's life cycle, Fig. 3 is interesting, but much detail is lost in reproduction at these sizes except in the case of the cockchafer where a near-success is achieved. The bulletin will be welcomed by gardeners and nurserymen alike as giving them up-to-date information on a wide range of pests. The recent death of its author is a great loss to horticultural entomology.

H.W.M.

## 2120. GADD, C. H.

**The commoner diseases of tea.**

*Monogr. Tea Prod. Ceylon* 2, Tea Research  
Institute of Ceylon, Colombo, 1949, 9½ × 6  
in., pp. 94, bibls., illus., Rs. 3.00 or 5s.

This is a full and authoritative book on the diseases of tea in Ceylon, and the author is not content with a mere enumeration of diseases, their symptoms and their treatments. The first few chapters deal with the physiology of the plant and the troubles which arise if conditions for optimum health and development are not as they should be. Considerations of this kind are particularly important in the case of the tea bush where the operations of both plucking and pruning interfere with the normal physiological balance of the plant. Conditions arising from lack of the essential nutrient elements are first considered. These include discussion of the importance of maintaining carbohydrate reserves in lowland tea by "rim-lung" pruning; the effect of water shortages and of waterlogging; and the role of copper in fermentation. Trace element deficiencies are not met with in Ceylon, though mention is made of sulphur deficiency in Africa as well as potash deficiency in Java. Before turning to fungus diseases a chapter is devoted to the activities of fungi as parasites and saprophytes, for, though some tea disease fungi are obligate parasites, others, such as root disease fungi, are facultative, living on live or dead material.

Four root disease fungi, *Ustilina zonata*, *Fomes noxius*, *Poria hypolateritia* and *Rosellinia arcuata*, are described. The latter two fungi occur in patches. *Poria* is now the commonest root disease in Ceylon, *Rosellinia* occurring mainly in the drier regions. The old method of *Poria* control, by trench digging around diseased bushes and two rows of apparently healthy ones, has proved a complete failure. It has been superseded by the digging up of diseased bushes and the apparently healthy ones around them until a complete ring of uprooted bushes is seen, by root inspection, to be healthy. *Rosellinia* is treated similarly if the attack is severe. *Ustilina* and *Fomes* infections originate at single stumps, and these, together with diseased tea bushes, are dug up and burnt.

Stem diseases, including that caused by the alga *Cephaleuros parasiticus*, are next described. Then comes what many will find the most interesting chapter in the book, for it deals with leaf diseases and in



particular with the dreaded blister blight which made its appearance in Ceylon as recently as 1946. Fortunately a great deal has already been learnt about *Exobasidium vexans*, and a knowledge of the conditions under which it will flourish and its point of entry into the plant (the young leaves) has made it possible to combat this disease by modifications of cultural practices, particularly with regard to pruning and plucking. The final chapters deal with diseases of nursery plants, with phloem necrosis caused by a virus, with nematode attack and a number of other conditions of minor importance. The whole book is well planned, clearly written and illustrated with some excellent photographs. C.W.S.H.

2121. HARDY, J.

*Flower production for market.*

Crosby Lockwood, London, 1950, 10×6 in., pp. 210, illus., 18s.

This is pre-eminently a practical work, purposely devoid of references to statistics and the estimated costs of production. The book is also devoid of references to a number of popular market subjects which would have been included had considerations of ultimate cost to the purchaser not intervened. However, despite omissions, no less than 25 flower crops for cutting or pot sale are found worthy of a chapter each, chapters which, though short, are to the point, and if well digested should go far to reduce that malady known as growers' headache, whether it springs from unthrifty plants or from a chronic tendency to "miss the market". The author considers that the British public is not flower-minded. It is difficult to agree with this conclusion. In London flower-loaded barrows are everywhere and few frequented thoroughfares lack a flower shop. In addition to the chapters on individual crops there is one on nursery lay-out, and one, perhaps the most useful of all, entitled "Important factors in the cultivation of flowers". Here is given an appreciation of the results, as far as they bear upon the growing of flowers, of the latest scientific research on soil composts, soil sterilization, soil blocks as pots, soilless culture, hormone treatments, electrical soil heating, the newest insecticides and the rest, a summary which should certainly save the progressive nurseryman a good deal of mixed reading. The book concludes with a chapter on packing, grading and marketing. The comprehensive index of nearly 1,000 entries indicates the wide field that is covered. The book is well illustrated. It can be confidently recommended to all engaged in commercial flower growing, and to the increasing number of amateurs who are not content to produce anything but the best. G.St.C.F.

2122. HASKELL, G.

*Plant breeders of the future.*

*Up-to-Date in Biology 2.* The Biological Press, London, 1950, 7½×5 in., pp. 34, 3s.

This little book was written primarily for students and is based on lectures that Dr. Haskell has given in England and America. As a brief introduction to the scientific background that lies behind the art of plant breeding it is to be warmly recommended, and for those who wish to pursue the subject further the author has added some very useful guidance on the choice of more advanced textbooks. In spite of the need for the utmost compression, the earlier sections give not

only an adequate account of the fundamental discoveries in genetics and cytology but an excellent conspectus of the most up-to-date findings of research in those fields. One is tempted to wonder, however, whether Dr. Haskell could not have made better use, in so very small a book, of the pages he devotes to the political aspects of genetics and his rather anecdotal treatment of the personal idiosyncrasies of Darwin and Mendel. However, these are minor blemishes in a booklet that in all other respects is admirable. H.M.T.

2123. HAWKER, L. E.

*Physiology of fungi.*

University of London Press, London, 1950, 8½×5½ in., pp. 360, bibl. 835, illus., 21s.

There has been a considerable accumulation of literature on fungal metabolism during the past three decades as a result of the rapid advances in industrial, medical and agricultural microbiology, but there has been no general textbook on the subject suitable for students of botany, and for non-botanists entering the field of microbiological research. Dr. Hawker's book will fulfil this requirement, in providing a clear and comprehensive survey of fungal growth, sporulation and variation, in relation to nutrition, temperature, light, pH and other environmental factors, together with purely biochemical aspects of respiration, fermentation and synthetic processes. A chapter on the interaction of fungi with other organisms includes sections on mycorrhizae, lichens, the physiology of parasitism and antibiosis.

The bibliography of 835 specific references, together with references for general reading given at the end of the chapters, is of value in providing a basis for wider study of particular aspects of the subject. *Physiology of Fungi* is particularly welcome at the present time, when the fundamental importance of physiological and biochemical concepts in fungal taxonomy is becoming more widely recognized. P.W.T.

2124. IGNATIEFF, V. (Editor).

*Efficient use of fertilizers.*

*F.A.O. agric. Studies 9*, 1949, 9×6 in., pp. 183, bibls. numerous, illus., \$2.00.

Thirty-six specialists from various countries have contributed to the production of this monograph, which is intended to serve agricultural administrators and advisers. It gives a comprehensive account of the principles involved in the use of fertilizers, manures and soil amendments, the materials used and their value, factors affecting their use, methods of application, and plant-nutrient relationships to soil regions. Reference is made to practices in all parts of the world. A list of references for further reading is given at the end of each section.

2125. JACKSON, R. L. O.

*Mushroom growing.*

English Universities Press, London, 1950, 9×5½ in., pp. 103, bibl. 11, illus., 9s. 6d.

This comprehensive book should be invaluable to those engaged or interested in mushroom culture. The numerous figures will help the commercial grower and amateur alike to benefit from Mr. Jackson's experience, and the chapter on pests and diseases is illustrated with plates showing some of the major troubles the grower may have to combat. The book is set out in a logical sequence, commencing with an outline of the life cycle

of the mushroom. A comparison between the grower's compost and natural media is made, and the difficulties of finding a suitable substitute for horse manure and wheat straw are indicated. The importance of having insulated, heated and draught-proof, ventilated buildings is stressed; that this is necessary is obvious because, owing to the temperamental nature of the mushroom, the slightest deviation from optimum conditions may be disastrous. The layout of a mushroom farm is discussed in some detail; this is extremely important with a view to ease of working, hygiene, economy and future development. The most unpleasant job in the growing of mushrooms is that of turning the manure. The reasons for this arduous work and the necessity of having the right type and age of manure are given. Manure heaps are usually used as a dump for various other items such as tins, oily rags and so on, which are inimical to the wellbeing of the mushroom and must be removed before turning commences. The lack of a suitable machine to do the heavy work at this stage is noted, and the requirements of an efficient composting machine are described. The casing of the beds, which is not always an easy operation, is discussed. After casing, the maintenance of the correct humidity is very important, since the careless use of water at this stage may ruin the crop. Diseases and pests are dealt with at some length. A warning is given against the continuous use of DDT and gammexane against any of the fly pests in case strains resistant to these materials should arise; the use of nicotine at intervals will greatly reduce this risk.

The author concludes by giving some figures on the outlay required, and discusses future developments with special reference to the production of new strains of mushrooms, alternative composts, automatic control of growing conditions and improved methods of packing. M.M.M.

2126. KELLEY, A. P.

*Mycotrophy in plants. Lectures on the biology of mycorrhizae and related structures.*

Chronica Botanica Co., Waltham, Mass., U.S.A., 1950, 9×6 in., pp. 223, bibl. pp. 24, illus., \$4.50.

In recent years the symbiotic association of fungi with the roots of the higher plants has interested botanists not only in its purely academic aspects but also because of its nutritive significance. Numerous papers have been written on mycorrhiza in forest trees (particularly conifers) and in a number of crop and ornamental plants, but the symbiosis of fungi with the roots of deciduous fruit trees seems to have been given comparatively little attention by research workers, and Dr. Kelley's new book has little to say about it. For this reason horticulturists of temperate regions may consider that, for them, the book is not very informative. Only brief references are made to the work of O'Brien and McNaughton on strawberry mycorrhiza and to that of Bouwens [*H.A.*, 7: 846] on quince and strawberry, but both these papers are summarized in the author's *The literature of mycorrhiza* issued in 1937, and this can be consulted for the literature on the subject up to that year. There is also a passing reference, in the preface, to the more

recent paper (1946) on fruit tree mycorrhiza in Poland by Dominik and Jagodzinski [*H.A.*, 17: 1209]. For a detailed review of the more general aspects of mycotrophy Dr. Kelley's book should interest all who study the physiological relationship between plants and the organisms of the soil in which they grow. If it should serve to rouse the interest of the horticultural botanist and induce a more intensive study of fruit tree mycorrhiza in its association with other aspects of plant nutrition it will have achieved one important purpose. H.W.

2127. LAURIE, A., AND RIES, V. H.

*Floriculture. Fundamentals and practices.* McGraw-Hill, New York and London, 2nd edit., 1950, 9×6 in., pp. 525, bibl. numerous, illus., 42s. 6d.

This book, which first appeared in 1942 [reviewed *H.A.*, 12: 1564], deals with the fundamentals and practice of floriculture as understood in the U.S.A. "Floriculture", as the authors remark, "is not static" and so a second edition has been produced in order to bring to notice certain changes in methods of culture attributed to discoveries made by research workers of the Federal and State agricultural experiment stations. In particular, pest control methods have undergone such great changes as to render the recommendations made in the previous edition quite out of date. Advances in the control of soil moisture are also said to be striking. These last are discussed, with special reference to bench watering in greenhouses, in the chapter on soils. The discussion on pest and disease control is very thorough and concludes with a list of "pesticide" materials containing so many deadly polysyllabic compounds that it is difficult to avoid sympathy for the unhappy insects destined to encounter them. Although written for American climatic conditions, in particular those prevailing in the State of Ohio, the book contains much basic information of value anywhere. The chapters on plant growth, soils, fertilizers, horticultural taxonomy and pest control form a textbook in themselves. The principles of garden design are comprehensively dealt with and well illustrated. Much of the planning is based on the assumption that the owners will be able to live in their gardens for a large part of the year and not just venture there occasionally, weather permitting, as with us: hence the emphasis on the "outdoor living room". The remaining chapters of the book deal with various classes of ornamental garden plants and their cultivation. G.St.C.F.

2128. LAWALRÉE, A.

*Flore générale de Belgique: Ptéridophytes. (A general flora of Belgium: Pteridophytes.)* Minist. Agric. Jardin bot. État, Brux., 1950, 10×6½ in., pp. 195, illus.

This comprehensive and very informative flora of the pteridophytes of Belgium is one of a series of six, which together will form a complete flora of Belgium. The others in the series, covering spermatophytes, bryophytes, algae, fungi and lichens, have not yet been published. A short introduction, dealing with the life cycle, diversity, hybridization and classification of ferns, is followed by an identification key and detailed notes on the individual genera and species including information on distribution throughout the world and in Belgium itself, habitat, and, in many cases,



uses and common names in French, Flemish, Walloon and German. The drawings and photographs included are good and clear, but more detailed illustrations of the structure and position of the industria and other characters used in identification would be useful.

P.R.-D.

2129. LAWRENCE, W. J. C.

*Science and the glasshouse.*

Oliver & Boyd, Edinburgh, revised 2nd edition, 1950. 9×6 in., pp. 175, bibls., illus., 15s.

The first edition of this useful book was reviewed in *H.A.*, 19: 689. In this edition, further information on the effects of firm and loose soil, and light at different times of the day and year, are given. The application of these and other experimental results has been expanded, and comprises an interesting and important chapter for those associated with the glasshouse industry.

M.M.M.

2130. NATIVIDADE, J. V.

*Subericultura. (The cultivation of cork oaks.)*

Ministério da Economia, Lisbon, 1950, 10×7½ in., pp. 389, bibl. 350, figs 41, plates 80, Escudos 225.00 (about 56s.).

The cork oak, which grows wild over large areas of Portugal and thrives on land too poor to be utilized for other crops, is one of the greatest natural resources of the country. More than half the world's supply of cork is produced in Portugal. The industry, however, is being threatened by bad husbandry and ignorance concerning the special requirements of the tree.

In this systematic and authoritative account of the cultivation and utilization of the cork oak, the author incorporates the knowledge gained from nearly 20 years' study of the subject. The first chapter deals with the distribution of the species and the development of the industry in various parts of the world, special attention being given to Portugal. Then follows a chapter on the botanical characteristics of the tree, its genetics and improvement, and the physiology of stripping, and one on the soils, climate and vegetation of the cork oak districts of Portugal. The fourth chapter, on cork, deals with its structure, formation, composition, properties, uses and possible defects. The next chapter on cultural practices, comprising nearly one-third of the book, gives a detailed account of methods of propagation, establishment of new plantations, management of young and mature groves, including stripping, pruning and cultivation of the soil, prevention of fire and control of pests and diseases. In a discussion of the economics of production, the uses and value of the cork, acorns, wood, bast and leaves are reviewed. Finally a summary is given of the Portuguese legislation relating to the production of the cork oak.

This much needed book, pointing out the way to a re-establishment of the industry on a sound basis, deserves the gratitude of all those concerned in its welfare. Even for those who cannot read Portuguese, the large number of first class photographs taken by the author, many of them extraordinarily beautiful, will be a source of considerable information and real aesthetic pleasure.

P.R.-D.

2131. PITTIER, H.

*Trabajos escogidos. (Selected works.)*

Minist. Agric., Crfa, Caracas, Venezuela, 1948, 6×9 in., pp. 246, bibls., illus.

This collection of some of the more important scientific works of Dr. Pittier, the great botanical explorer, contains papers on "The development of natural sciences and botanical exploration in Venezuela"; "Explorations, botanical and otherwise, round the lake of Maracaibo"; "A catalogue of common plants in the State of Zulia", with common and Latin names, classified according to their uses; "The degeneration of *Cacao* as a result of natural hybridization"; "The effects of destruction of woods and burning of plains", a deprecation of practices, common in Venezuela, that lead to soil erosion; "Notes on the plant geography of Venezuela"; "A classification of woodlands"; and "The plant geography of the Guanipa plain", including notes on the agricultural and industrial potentialities of the area, and a list of plants found there, giving their common and Latin names and uses.

2132. SMITH, K. M.

*An introduction to the study of viruses.*

Pitman, London, 1950, 8½×5½ in., pp. 106, bibl. 145, illus., 10s. 6d.

The growing threat of virus diseases to the continued health and productivity of horticultural and other crop plants, and ornamentals, is now a generally accepted commonplace, and a considerable specialist literature in many languages on research into their identification and control is widely scattered throughout many scientific publications. A similar and even more bulky literature covers the analogous spheres of animal viruses and bacteriophage, and the available textbooks are limited to one or other of these three branches. The appearance, therefore, of a volume aiming at surveying within a short and readable compass our present knowledge of the whole "discipline of virology" in animals, plants and bacteria is therefore particularly useful at the present juncture. To do so in 9 chapters, covering 95 pages in all, itself implies no mean discipline, and on the whole this well-known authority on plant viruses is to be commended for a very readable and well-illustrated introductory essay to this vast and intricate field of research. The survey concludes with a bibliography, arranged under chapter headings, of some 145 key references.

Perhaps inevitably with such compression, inaccuracies have crept in (for instance, in certain references to virus diseases of fruit crops on page 93), and there are conspicuous omissions (e.g. of references to fruit and cacao viruses) in the bibliography and in the index. It is to be hoped that the former will be corrected and the latter made good in future editions.

R.V.H.

2133. STEBBINS, C. L., Jr.

*Variation and evolution in plants.*

Oxford University Press, London (Geoffrey Cumberlege), 1950, 9×6 in., pp. 643, bibls. numerous, figs 55, 50s.

Although the main structure of Darwin's great theory of the origin of species by natural selection has remained essentially untouched by almost a century of critical research, the overall picture of organic evolution that can now be presented is far wider. The great weakness

of Darwinism as originally expounded lay in its inability to explain fully the origins of the variation patterns found in nature, and its reliance, at least by implication, upon the now discredited theory of the inheritance of acquired characters. The solution of the mainly genetical problems involved had to await the fuller development of the science. It was soon realized that the segregation and recombination of genes within the strictly Mendelian framework were scarcely sufficient in themselves to give rise to the great diversity of types necessary for the efficient operation of natural selection. That spontaneous mutations had an important bearing upon the evolutionary processes was widely recognized even in Darwin's day, but a theory of evolution based exclusively on mutations left many vital difficulties unresolved. It is only within the last few years that a clear picture has emerged of the way in which variation in the organic world is maintained, and of the vast forces continually at work evolving and adapting organisms to ever-changing environments. This is the fascinating theme of Professor Stebbins' book which presents in an eminently readable form the evidence that has accumulated upon the subject. Although this book does not claim to be a complete restatement of the theory of evolution, it reviews the experimental evidence for natural selection after a thorough treatment of variation patterns in plant populations, particularly in relation to the more recent work in ecology. Although much new information is now available about variation in natural populations, work in this field must always suffer from the lack of precision inherent in studies on large aggregations ranging over extensive habitats, and many conclusions can only be inferred. The author's statement on page 152, that "the problem of the evolutionist is no longer that of finding unknown causes for evolutionary progress or direction but of evaluating on the basis of all available evidence the role which each of the known forces has played in any particular evolutionary line", is perhaps the best commentary upon the progress that has been made.

It is where it leaves traditional evolution to enter the domains of genetics and cytology that this book shows most striking progress. Much of the more recent information is dispersed in little known periodicals, and the author has shown much skill in weaving the rather tangled skein of researches into a single fabric in which the generalized patterns of evolution can be plainly seen. Now that the mechanism of variation has been revealed it is easy to see that the Darwinians were only partly right in ascribing the origin of species to natural selection. Within the karyotype, forces of equal importance and potency are at work varying the patterns of the chromosomes by interchange, loss and duplication. To achieve adaptation to its environment the organism must find and maintain a stable chromosome balance. Of all the disruptive forces within the karyotype, polyploidy is by far the most important. Whatever doubts may still exist as to the means by which the diploid plants, with their well-defined gametophyte and sporophyte phases, evolved from their more primitive ancestors, there can be no doubt that this evolutionary step was followed by genetic consequences of fundamental importance. Dr. Stebbins shows how gene mutations, exposed immediately in the haploid to the discriminating action of selection,

can be conserved in the diploid, and how advantageous the segregation and recombination of genes possible in the diploid can be to an organism adapting itself to changing ecological conditions. The larger transitions involved in polyploidy above the diploid level are of equal or greater significance. The practical plant breeder has been quick to make use of the artificially created allopolyploid in which fertility is restored to the sterile hybrid between species. The importance of polyploidy in the evolution of economic crops may be exemplified by the fact that no fewer than eleven such crops, including wheat, oats, potatoes, sugar, tobacco and cotton, are all polyploids. In nature they appear to have been selected because they are more successful as invaders of newly opened habitats and more tolerant of extreme ecological conditions.

The great evolutionary possibilities of the process hardly require emphasis. The newly formed polyploid, particularly if it is an allotetraploid, is often highly fertile and capable of giving rise rapidly to a large and uniform progeny. Upon the possibilities of producing new races of plants of economic value by the artificial doubling of the chromosomes, Dr. Stebbins is inclined to be somewhat cautious. The autopolyploid is likely to be of reduced fertility, particularly if derived from pure lines of self-pollinating diploids. The best possibility for obtaining desirable autopolyploid varieties of such plants lies in the production of polyploids from many different diploid lines possessing desirable characteristics, with subsequent hybridization and selection. With regard to allopolyploids he is rather more encouraging.

Dr. Stebbins' treatment of polyploidy naturally leads him to a consideration of apomixis in relation to evolution and the maintenance of unbalanced species in nature. He shows us that methods of apomictic reproduction may vary very widely and that, while obligatory apomixis is comparatively rare in nature, many species are facultatively apomictic and, in some, sexual and asexual reproduction may go on together. The significance of the process from the evolutionary point of view is not difficult to see. It enables well adapted and vigorous but sexually sterile forms to maintain themselves, and it permits the rapid building up of large populations of genetically similar individuals for the colonization of new areas.

The concluding chapters deal with evolutionary trends in the karyotype and in the external morphology of plants, and the book ends with a treatment of the distribution and rates of evolution of fossils. The author has much that is interesting and new to say about evolutionary changes in the basic number, form and size of the chromosomes as well as about the progressive differentiation and specialization of the various organs of plants. He points out the seeming paradox that increase in complexity in plants results mainly from two processes, reduction and fusion, which would appear to be degenerative. Darwin devoted a considerable part of *The Origin of Species* to the evidence for evolution based on the geological record. Dr. Stebbins is able to add the results of half a century of very active research upon the world's fossil flora and his final chapter upon this subject gives us an admirable summary of the present position.

This book can be wholeheartedly recommended to those who are interested in the study of evolution,



particularly in relation to the newer discoveries of genetics, cytology and ecogeography. The author is to be congratulated upon having compressed into the compass of a single volume a formidable amount of new information which he has welded into an extremely readable narrative. H.M.T.

## 2134. WESTCOTT, C.

*Plant disease handbook.*

D. Van Nostrand Co. Inc., New York, and Macmillan & Co. Ltd., London, 1950, 9½×6 in., pp. 746, selected bibl. 7½ pp., illus., \$7.50 or 56s.

This is stated to be "a reference book for professional and amateur gardeners and those who advise them", and to be "organized to afford quick, accurate detection of diseases caused by bacteria, fungi, viruses, nematodes, and nutrient deficiencies. Trees, shrubs, vines, lawn grasses, flowers, vegetables—and native plants used for home wild gardens or for park and highway plantings—are all included". Truly the scope is wide, for the diseases and disorders mentioned number nearly 1,500 and they affect about 1,000 host plants. It is evident that relatively few of these can be treated adequately, and many of the diseases are dismissed with little more than a mere mention. The author recognizes the difficulty in catering for both the practical grower and the scientific horticulturist; but it is doubtful whether the arrangement of the subject matter she has chosen is well suited to the attainment of this objective. For the gardener the plant rather than its parasite should receive prominence in the text, but on opening the book at any page the scientific name of the causal organism in heavy type strikes the eye immediately, and finding a particular host and diagnosing a disease cannot be said to be "quick". There is, however, a chapter consisting of a list of host plants (in alphabetical order of the genera) and their diseases, which will help to get over the difficulty, but it would have been more useful if the pages where they are mentioned were quoted.

With reference to the use of chemicals for controlling diseases the author says that sometimes such measures should be left to the professional grower, for "it is far better for the grower to sell a healthy plant than for the gardener to try to cure a sick one". Nurserymen should bear this in mind and make every effort to send out disease-free material. It is certain that plants are often distributed from the nursery with incipient diseases already on them.

A chapter on garden chemicals and their application not only mentions long-recognized fungicides but also indicates the possibilities of some that have been introduced in recent years. There are many good illustrations, but some are rather marred by having the subject too near the background so that unsightly shadows are cast.

The book, written primarily for American readers, shows the great number of plant diseases that the American gardener has to contend with, but as many of the diseases mentioned also occur in other countries, much of the advice given is applicable elsewhere. The book should thus serve as a general guide to the protection of garden plants and as a check to the recognition of any new disease that may enter a particular country from abroad. H.W.

## 2135. WILKIE, D.

*Gentians.*

Country Life, London, revised edition, 1950, 9×5½ in., pp. 255, illus., 25s.

The first edition of this book appeared in 1936 and, understandably, soon became out of print. This revised edition contains a few alterations, such as additional new species not yet in cultivation nor yet described, certain species transferred to the list of synonyms, and the addition of new figures; otherwise little change has been made. Until the advent of this book, information on gentians, either in the garden or the wild, had never been collected but had remained scattered in botanical and horticultural literature, and even when discovered might consist quite as much of fiction as of fact. The author set out to remedy this, and has succeeded well. An attempt has been made to give brief notes on every species which has been described or mentioned by name up to 1940. These, after allowing for recurrent amnesia on the part of this reviewer during the count, appear to number no less than 871, excluding synonyms, which are scarcely less numerous. Species that are in, or are likely to return to, cultivation, to the number of 109, are dealt with *in extenso*, a page or more being allotted to each. Here will be found a full description of the species, its horticultural history, advice on its cultivation and, in most cases, a photograph of the plant in growth. There have been many hybrid gentians recorded in the past, but those cultivated to-day are born of species of recent introduction. Some of these are of exceptional merit; for example, *G. macauleyi*, the offspring of *G. sino-ornata* and *G. farreri*, two forms of which received R.H.S. awards on the same day. Some gardeners are as shy of gentians as others are of lilies, possibly because of Farrer's elaborate instructions for their maintenance in which underground waterworks were prominently featured, but in reality most gardens can be made to support some species without actually bankrupting their owner. One of the purposes of this book is to assist in the selection and placing of suitable species in accordance with local conditions, and whose aspires to grow gentians well and in variety should move to procure it. The author indulges in no rhapsodies, no fancy bits about heaven's blue and the rest, but keeps strictly to the business of providing information. The result is a workmanlike book which he avers is neither a monograph nor a scientific treatise. Perhaps not, but to many it will be of more practical value than either. G.St.C.F.

## 2136. WILLIAMS, R. O.

*The useful and ornamental plants in Zanzibar and Pemba.*

Zanzibar, 1949, 8½×5½ in., pp. 497, illus., 21s.

Although this book has special reference to Zanzibar, in that only plants growing there are mentioned, it in fact provides a full and useful descriptive catalogue of plants cultivated for beauty or use throughout much of the tropics. Thus its appeal should extend far beyond the limits suggested by the title. References to tropical plants not grown in Zanzibar will almost surely be found in the author's earlier work, *The useful and ornamental plants in Trinidad and Tobago*, which does for the western tropics what this book does for

the eastern. The main part of the book consists of plant descriptions arranged alphabetically. Botanical, English and Swahili names are included in this list, the last two being cross-referenced to the scientific name under which the notes will be found. Cycads, ferns, fodder and lawn grasses, and orchids are, however, arranged under these group headings. There are also classified lists of useful plants, with a note of the parts employed, a key to the ornamental plants to facilitate identification, lists of ornamental plants for various situations and purposes and a list of harmful plants. The illustrations and particularly the line drawings are numerous and excellent, and great care has been taken to ensure botanical accuracy. They should prove very helpful in questions of identification. The author, who was Director of Agriculture in Zanzibar, has spared no pains by local enquiry, field studies and search through standard reference works and botanical and agricultural publications to obtain whatever information is available, and his efforts have been fruitful indeed in providing a wealth of material of quite unusual interest. No horticulturally-minded reader could fail to be captivated by it. An introduction is supplied by Major E. A. T. Dutton in the form of an entertaining dissertation on plant nomenclature, which later transforms itself into a miniature treatise on elementary plant morphology embellished with copious explanatory illustrations. The less instructed will find this useful in interpreting the few botanical terms used in the book. G.St.C.F.

2137. WISHART, J.  
**Field Trials II: The analysis of covariance.**  
*Tech. Commun. Commonw. Bur. Plant Breed. Genet.* 15, 1950, 10×7 in., pp. 35, 3s. 6d.

With long-lived plants the analysis of covariance is one of the most valuable of statistical techniques and a warm welcome is due to this description of it, written by one whose researches contributed notably to its early development. Needless to say, the account is both accurate and comprehensive. In the opinion of the reviewer, however, it could perhaps be improved in a later edition by more of what the mathematician contemptuously rejects as "talkie-talkie". Worked examples and algebra are very desirable, but the non-mathematician usually appreciates verbal descriptions of what algebraic expressions are supposed to represent. Without them his statistics degenerates into the crudest "rule of thumb" empiricism. In this one respect many will find this communication defective, though others may delight in its severity of style. S.C.P.

2138. ZAMBRA, G. L.  
**Violets for garden and market.**  
Collingridge Ltd., London, and Transatlantic Arts Inc., New York, 1938, revised 1950, 8½×6 in., pp. 79, illus., 10s. 6d.

The book has been written by an enthusiast and is worth a place on any violet lover's bookshelf for its very complete list of varieties. Coloured plates add to its attractiveness, but the value of these would have been enhanced if a name key to each coloured plate could have been provided.

From a cultural standpoint the book could have been arranged in a better sequence, and there is scope for improvement in technical data. Several sections

could be augmented with advantage, particularly the commercial sections on propagation, planting, management and marketing. Planting distance for the commercial production of singles is too close at 12 in. The book makes pleasant reading, and considerable research has resulted in an interesting chapter on rhymes and recipes. With the disappearance of many varieties from private and commercial gardens in the war period, the comprehensive chapter on varieties will remind us of many old friends in the violet world and instil a desire to reinstate them as and when opportunity occurs. It is a commendable effort to popularize and extend violet production. H.W.A.

## Reports.

2139. ACOCK, A. M.  
**Progress and economic problems in farm mechanization.**  
F.A.O., Washington, D.C., 1950, 9×5½ in., pp. 88, bibl. in text, illus., \$1.00.

This report brings together, for the first time, information on progress in the manufacture and utilization of farm machinery and equipment and on world trade in these products. Together with a review of these trends, it examines some of the complex economic problems associated with raising the level of farm mechanization. These problems vary sharply from country to country and from region to region. The report is offered for the use of government officials and others interested in improving the standard of farm equipment in their respective countries and in developing programmes suited to local conditions. [From author's preface.]

2140. AFRICAN EXPLOSIVES AND CHEMICAL INDUSTRIES.

### **Better turf through research.**

African Explosives and Chemical Industries and the South African Turf Research Fund, 1948, 9×6 in., pp. 90 [received 1951].

The publication contains accounts of experiments with *Cynodon dactylon* and other species carried out at the South African Turf Research Station. Separate abstracts of some of these papers are given in the appropriate section.

2141. AMSTERDAM. ROYAL INSTITUTE FOR THE INDIES.  
**39ste Jaarverslag Koninklijke Vereeniging Indisch Instituut, Amsterdam, 1949. (39th Annual Report of the Royal Institute for the Indies, Amsterdam, 1949.)** 1950, pp. 75, illus.

This contains reports from the departments of tropical products, ethnology and tropical hygiene. A fuller report from the Tropical Products Department has been abstracted in *H.A.*, 21: 1211.

2142. ANDERSEN, F. G. (UNION OF S. AFRICA, DIVISION OF HORTICULTURE.)  
**Horticultural problems in the Union.**  
*Fmg S. Afr.*, 1950, 25: 467-70.

The following research work is summarized in this annual report of the Division of Horticulture, Department of Agriculture, S. Africa, for 1949-50. *Citrus*: The most important results obtained to date in the permanent fertilizer project at Nelspruit are summarized



as follows: Yield: (i) both N and P are necessary for maximum production; (ii) during the first 12 years P is more important than N, although both are lacking in the soil; (iii) during the 14th year the need for N exceeds that for P; (iv) K and Ca have no effect on yield. Quality: (i) N decreases and P and manure increase the juice content and size of the fruit; (ii) N and K increase, and P and manure decrease, the acid content of the fruit; (iii) N increases the rind thickness of the fruit and P and manure decrease it; (iv) differential fertilizer treatments have no significant effects on T.S.S. content. Observations on the effect of time and amount of water applications are summarized, the 1949 results being, on the whole, in agreement with those of earlier years. Clean cultivation, cover crops and permanent weed growth are compared in an experiment at Nelspruit sub-station at Alkmaar. *Other subtropical fruits:* Avocado and mango trials are discussed. Papaw breeding has resulted in producing uniform seed, plants from which are now being used for preliminary fertilizer and sand culture trials. *Vegetables:* In onion variety trials Texas Grano was again the most satisfactory variety in the Transvaal and its propagation by the trade has been initiated, though the selection of strains continues. Other variety trials were carried out with tomato and cabbage, and experiments on tomato manuring are recorded. The composition of tomatoes, as affected by different factors, was also studied. Work on vegetable breeding and selection has expanded considerably. *Pineapples:* Steps have been taken greatly to extend investigations on production in the eastern Cape Province. *Deciduous fruit:* The most promising peach varieties grown under semi-tropical conditions at Nelspruit are named. The new farm purchased for the Pretoria Horticultural Research Station has made it possible to begin extensive investigations on deciduous fruit growing in the summer rainfall area. *Floriculture:* A new section has been started at the Pretoria Horticultural Research Station. *Inspection and control:* The report concludes with notes on fruit inspection and seed inspection and certification.

## 2143. BORGSTRÖM, G.

Av Jordbrukets forskningsråd utförd lagringsforskning. Redogörelse för lagringsforskningskommitténs verksamhet 1945/46-1948/49. (Report of the Storage Committee of the Swedish Agricultural Research Council for the years 1945/46-1948/49.) [English summary  $\frac{3}{4}$  p.]

J. roy. Swedish Acad. Agric., 1950, 89: 153-80, bibl. 56.

The report reviews the work carried out under the auspices of the Storage Committee. Research on potatoes, fruit and vegetables is covered, besides some purely agricultural products.

## 2144. BRITISH COMMONWEALTH SCIENTIFIC OFFICIAL CONFERENCE.

Plant and animal nutrition in relation to soil and climatic factors.

Rep. Specialist Conf. in Agric., Australia, 1949, 1950, pp. 15. H.M. Stationery Office, 9d.

This report gives the composition of the Conference, and preparatory arrangements, followed by a list of

the papers read and by recommendations and resolutions on research and its better integration.

## 2145. BRITISH GUIANA.

*Administration Reports of the Director of Agriculture B. Guiana for the years 1947, 1948, and 1949*, pp. 15, 20 and 20 respectively [received 1950].

Brief summaries are given of production of sugar, coconuts, coffee, citrus and rubber. Notes are included on variety, cultivation and manurial trials with sugar cane, populations and yields of coconut palms and the development of the citrus industry.

## 2146. BRITISH GUIANA.

*Annual Report (Divisional) of the Department of Agriculture B. Guiana for the year 1947*, pp. 28 [received 1950].

Among divisional reports that of the Marketing Division gives acreages planted to sugar cane, coconuts, coffee, cocoa, fruits and rubber.

## 2147. BROWN, D. D. (S. RHODESIA, DEPARTMENT OF AGRICULTURE).

*Summary of Annual Report of the Chief Tobacco Officer for the year ended 31st December, 1949.*

Rhod. agric. J., 1950, 47: 321-6.

*Research:* Rotation experiments have confirmed previous findings, that (a) best quality tobacco was obtained following grass or fallow, (b) a legume grown immediately prior to tobacco was detrimental to quality, and (c) the application of compost following crop rotations was beneficial to the subsequent tobacco crop. In spacing trials 3 ft. 6 in.  $\times$  2 ft. gave the best results, as in previous trials. Increasing N above an amount equivalent to 24 lb. per acre for tobacco spaced 3 ft.  $\times$  3 ft. did not increase yields, but the season was a dry one. In variety trials the outstanding varieties were C7 (Jamaica Wrapper  $\times$  Bonanza), Bonanza and Yellow Mammoth. In trials to control root-knot nematode it was found that 6-8 c.c. DD per square foot was the minimum satisfactory dosage. White grubs and wireworms were effectively controlled by applying 0.5% BHC at 18-24 lb. per acre before planting. Engineering research included the design of a new wood-burning furnace and of a new and more efficient type of conditioning pit. A cigar tobacco experiment station has been opened at Chipinga; the Turkish tobacco station at Umgusa, Bulawayo, has been closed down.

## 2148. CANADA.

*Report of the Minister of Agriculture for Canada for the year ended March 31, 1950*, 1950, pp. 287, 50 cents.

The following are among the numerous subjects investigated: *Botany and plant pathology:* Weed control and surveys, effect of herbicidal oils on the physiology of plants, potato blight control and other potato diseases, the use of radio-active phosphorus P<sup>32</sup> in estimating the virus content in potatoes, diseases of vegetables, fruits and ornamental plants, and control of seed-born diseases. *Plant chemistry:* Tissue analyses for mineral nutrition, composition and keeping quality of apples, harvesting maturity of peas and corn, blackening of potatoes upon boiling, and analyses of insecticidal and

fungicidal residues on fruits and vegetables. *Entomology*: Fruit, vegetable, potato and tobacco insects and their control, an insect pest survey. *Plant protection*: Inspection and interception in ports, pest and disease inspection and control on a national scale. *Horticulture*: New varieties of raspberries, cherries and peaches, rustless black currants, and a new thornless gooseberry; weed control in strawberries, indexing strawberries for virus diseases, vegetable breeding, blight resistant potatoes; studies on high N levels in apple foliage associated with lowering of fruit quality, fertilizer placement for tomatoes and investigations in floriculture. Work on fruit and vegetable processing and storage is also reported. *Tobacco*: New varieties with improved yield and quality, and others with resistance to black root-rot; soil management including crop rotations and nutritional, physiological and analytical studies. *Sprinkler irrigation* in orchards. *Marketing* of fruit and vegetables.

2149. COMMONWEALTH ECONOMIC COMMITTEE.

*Plantation crops.*

Commonw. econ. Cttee, 1950, 9½ × 7 in., pp.

103, H.M. Stationery Office, 5s.

The sub-title to this publication reads: "A summary of production, trade and consumption relating to sugar, tea, coffee, cocoa, spices, tobacco and rubber." The period considered is that from 1937 to 1949, and figures are tabulated by the main producing countries for acreages, production, and exports expressed as quantities and values. Similarly imports and consumption are tabulated by countries, and prices ruling in the principal markets are listed. The spices considered are pepper, cloves, ginger and, in less detail, nutmegs and mace, cinnamon, cassia, capscums and chillies, pimento, cardamoms and vanilla.

2150. COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION, AUSTRALIA.

*Second Annual Report for the year ending 30 June, 1950*, Melbourne, 1950, advance copy, pages numbered sectionally.

The following sections are of horticultural interest: III. *Plants*. 11. *Weeds*. Effect of growth substances on perennial weeds; control of perennial grass weeds with oils; control of mint-weed, timber regrowth and mistletoe; tracer element investigations on the translocation of herbicides; translocation and mechanism of 2,4-D. 12. *Introductions*. 632 samples were received, including a number of wild onions and relatives of other crop plants for use in disease studies, the drug plant *Strophanthus sarmentosus*, *Rumex hymenosepalus* a source of tan extracts, sunflower, safflower and *Guizotia abyssinica*, a West African oilseed. 16. *Fruit investigations*. In the orchard trial at Stanthorpe, Qd, in which various Malling stocks are being compared with seedling and Northern Spy stocks, Jonathan trees on M. XII gave the highest average yield, followed by Jonathan on M. XVI. In a pruning trial with apples, the lightest pruning (Wickens method) continued to give the highest yield of good quality fruit on all rootstocks. In a nursery trial with Williams' pears on five clonal rootstocks, the largest trees were produced on the rootstocks D3 and *Pyrus calleryana*, and the largest crops by D3. Studies are being continued on the problem of replanting apple

trees on old apple soils. 17. *Drug plants*. Studies on *Papaver somniferum* and *Duboisia* spp. were continued, and a survey was made of native plants in a search for substances of pharmacological value and chemical interest. 18. *Tobacco*. Work included irrigation experiments, variety trials, breeding for mosaic resistance, a study of the big bud and yellow dwarf viruses and of "trashiness", physiological investigations into the water requirements of tobacco and suckering, fertilizer trials and soil sterilizing treatments. 19. *Plant diseases*, including potato virus diseases, scab, *Rhizoctonia solani* and late blight; fusarium wilt of tomatoes; brown rot of stone fruits; and the use of antibiotics. 20. *Vegetables*. Virus resistance in potatoes, spotted wilt, early blight and root-knot nematode resistance in tomatoes and disease resistance in beans and peas were studied.

IV. *Irrigation*. 2. *Merbein, Victoria*. The work includes studies of irrigation methods, soil conservation and reclamation, cultivation and prevention of diseases of vines, citrus and vegetables, and fruit processing. 3. *Griffith, N.S.W.*. Work has been concentrated mainly on physiological and chemical studies of plants under irrigation when subjected to various manurial and management practices; a study of the physiological properties of soils under irrigation; and a detailed study of tree development and yield of oranges under various cultural, irrigation and fertilizer practices.

IX. *Entomology*. 5. Biological control of St. John's Wort, cabbage moth, cabbage butterfly, green vegetable bug and red spider. 8. Control of cockchafer causing defoliation of eucalypts. 10. Control of insect vectors of viruses and fundamental problems of transmission. 12. Control of orchard mites and woolly aphids.

XII. *Food*. 2. *Physics of transport and preservation* includes a cold store survey and studies on the relationship between the rate of evaporation from fruit and the drying potential of the storage atmosphere. 3. *Food chemistry*. Investigations on the oil and cutin fractions of the natural coatings of apples, and the organic volatiles produced by apples. 4. *Microbiology*. A field experiment to determine the susceptibility of Statesman apples to infection by conidia of *Gloeosporium album* is being continued. 8 and 9. *Fresh fruit and vegetable storage and transport*. Salt absorption and accumulation in carrot tissues; the rise in respiration of fruit at the time of ripening; N metabolism in apples; the relationship between the development of the apple on the tree and its storage behaviour; skin coatings for fruits; the relationship between maturity and storage behaviour in apples; cool storage of peaches and nectarines; storage of lemons, oranges and pears; reducing brown rot losses after picking; transport of peas and beans; and methods of sterilizing fruit infected with Queensland fruit fly.

2151. DANSK GARTNERFORENING (DANVIG, A. M., AND PEDERSEN, K.).

*Årbog for gartneri*. (*Horticultural Year-book 1950*.)

S. L. Møllers Bogtrykkeri, Copenhagen, 1951, Vol. 32, pp. 212, Kr. 3.

The yearbook again contains much general information on Danish horticulture and on the results of



experiments (see also *H.A.*; 19: 1670). In fertilizer trials with trace elements on celery, beetroot, carrots and roses responses were obtained from applications of manganese and zinc and in some cases of boron. In experiments with tomatoes grown on steam-sterilized soil the effect of boron was insignificant. Manganese increased yields where the Mn content of the soil was low, but it did not influence "green scald" [green back?] incidence. Potassium, however, prevented "green scald" if applied early in cases of K deficiency. The disorder was also found to be influenced by the K:N balance. As a result a 3-years' study on the influence of shallot size on the size and number of bulbs produced, it is recommended that small bulbs should be used for market production and the larger bulbs as sets. Observations indicate that small bulbs show a higher proportion of virus infection; hence the importance of using large bulbs for propagation. In another experiment with shallots different storage temperatures for the period November to March were compared. Yields from bulbs kept at 28° C. from the New Year onwards, with no heat previously, were at least as high as those from bulbs stored at 28° C. for the whole period. Other experiments reported upon include vegetable variety trials, storage trials with tulips and manurial trials with bulbs.

2152. DAVEL, H. B. (AGRICULTURAL RESEARCH INSTITUTE, PRETORIA).

**Research in agricultural problems.**

*Fmg S. Afr.*, 1950, 25: 471-7.

This annual report of the Agricultural Research Institute, Pretoria, for 1949-50, contains information on the following horticultural investigations. *Weed control*: In experiments a pre-emergence application of 2,4-D was most effective in controlling annual weeds, such as *Portulaca*, *Elusine*, *Indica*, *Amaranthus* and *Datura*, but nut grass (*Cyperus rotundus*) was not affected. Spraying during the growing season destroyed the above-ground parts of nut grass but failed to kill the underground organs. *Plant pathology*: A highly aggressive invader of mushroom beds, which caused much damage, was identified as *Psalliotia arvensis*. Mycelium of this fungus survived steam pasteurizing of the compost for 48 hours. *Citrus*: The budded progeny of selected grapefruit trees from the Sundays River Valley and other areas are being studied at the Citrus Research Station, Addo, to test their tolerance or resistance to "stem pitting". The preliminary results of this work are promising. At the Agricultural Research Institute, Pretoria, a project is under way to establish virus-free nucellar selections of the standard citrus varieties. In a study of the "greening" disease, observations have shown that the fruit abnormality is associated with characteristic leaf symptoms which are suggestive of virus infection.

2153. DYER, R. A. (UNION OF S. AFRICA, DIVISION OF BOTANY AND PLANT PATHOLOGY).

**Botanical survey and research in plant diseases.**

*Fmg S. Afr.*, 1950, 25: 463-6.

The annual report of the Division of Botany and Plant Pathology, Department of Agriculture, S. Africa, for 1949-50. *Citrus diseases*: Spraying experiments in various districts have again shown that black spot

(*Phoma citricarpa*) can be controlled by a weak Bordeaux mixture (2-1-80) with a casein spreader, to be applied at two-thirds petal fall with two further applications at 6-week intervals. Ascospores from dead leaves collected beneath trees which have never shown visible signs of black spot, produced visible spots on smooth-lemon leaves in the greenhouse. This proves that under favourable conditions the disease might break out in any area where the fungus is present. From the experimental evidence now available there is proof of the widespread, if not universal, occurrence of a virus infection in commercially grown citrus in S. Africa. Transmission of the virus by grafting or *Aphis citricidus* induced symptoms of incompatibility or tristeza in sweet orange on sour orange rootstocks, and of "stem-pitting" in grapefruit and other susceptible species. *Vegetables*: The breeding of potatoes, tomatoes and eggplants for disease resistance continues.

2154. EAST AFRICA HIGH COMMISSION.

**Annual Report of the East African Agriculture and Forestry Research Organization for 1949, 1950, pp. 44, price 2s.50.**

It is noted that progress has been made in developing a new research station at Muguga. The administrative headquarters of the organization are being moved to Nairobi. Work undertaken during the year in different parts of East Africa included investigations on virus diseases of cassava, the botanical classification of new material, extensive soil and fertilizer analyses, and fertilizer trials on various crops including sweet potatoes. In further investigations in Zanzibar on the "sudden death" of cloves, all preliminary attempts to transmit the disease by mechanical inoculations have so far failed; fungi associated with the disease are mentioned, and a non-pathological necrosis of seedlings under nursery conditions is reported.

2155. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS.

**Yearbook of Food and Agricultural Statistics, 1948. II. Trade.**

F.A.O., Washington, D.C., 1949, 11×8 in., pp. 261. [English and French, notes in Spanish], \$3.50 or 24s. 6d.

Statistics of imports and exports for the various countries of the world are given for the following commodities: grains, sugar, potatoes, edible dry beans, oilseeds and vegetable oils, fruit and wine, onions, coffee, cacao, tea, hops, pepper, tobacco, fibres, livestock, and livestock products. Explanatory notes are provided on the commodities and countries included.

2156. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS.

**Yearbook of Food and Agricultural Statistics, 1949. I. Production.**

F.A.O., Washington, D.C., 1950, 11×8 in., pp. 313. [English, French and Spanish], \$3.50 or 24s. 6d.

This yearbook contains tables of statistics for the various countries of the world on land use; population, including the agricultural labour force; crop production; livestock; means of production, including production and consumption of commercial fertilizers,

number of tractors used in agriculture, and quantities of pesticides used; and prices.

2157. FORT VERMILION (LOWE, V. J.).  
*Progress Report Dominion Experimental Substation, Fort Vermilion, Alberta, 1939-1948*, 1950, pp. 40, illus.

The following has been selected as of horticultural interest: *Climate*: A summary of meteorological readings gives the extreme temperatures recorded over a 40-year period (1909-1948). During July a temperature of 100.5 °F. has been noted, while during one January -78° F. has been recorded. Information is given regarding average temperatures, precipitation, sunshine and occurrence of frost and frost-free periods. *Crops*: Of the soft fruits, currants, gooseberries, and raspberries have grown and cropped well and the yields of several varieties are tabulated; strawberries appear promising, given some protection in winter. Of the tree fruits only crab apples and the hardiest of commercial apples and plums have proved successful. Extensive tests have shown that almost any vegetable crop can be cultivated successfully. Brief notes are given on 23 species. Limited flower trials have been carried out during the period under review, and species and varieties recommended as suitable for the area are listed.

2158. FRUIT AND VEGETABLE PRODUCTS RESEARCH COMMITTEE, DEPARTMENT OF AGRICULTURE, CANADA.  
*Annual Report, 1949, 1950*.

This contains brief reports from the following 7 centres. Only items of direct horticultural interest are noted here.

- (i) Kentville, N. S. (Hope, G. W.).  
*Report of the Fruit Products Laboratory, Kentville, 1949-50*, pp. 4.

The quality of a number of varieties of strawberries, raspberries, peas, rhubarb and sweet corn after freezing was compared. A comparison was also made of the value of 6 varieties of grapes used for making jelly.

- (ii) Summerland, B.C. (Atkinson, F. E., Strachan, C. C., and Moyls, A. W.).  
*Report of the Fruit and Vegetable Products Laboratory, Summerland, 1949-50*, pp. 18.

Pea varieties were rated according to their suitability for freezing. The Bing variety of cherry was found to be best for the manufacture of "cherry olives".

- (iii) Division of Bacteriology and Dairy Research, Science Service, Department of Agriculture (Jones, A. H., and others).  
*Report 1949-50*, pp. 27.

- (iv) Division of Horticulture, C.E.F., Ottawa (Phillips, W. R., and Poapst, P. A.).  
*Low Temperature Investigations, Storage Laboratory, Ottawa, 1949*, pp. 21.

The benefits of ventilation and air filtration; varietal notes at 32° F.; gas storage; storage behaviour of McIntosh apples treated with a harvest application of sodium 1-N.A.A.; effect of maturity on bruising of apples; pectin trends in cold stored apples; fungal rot control; maturity studies; and apple quality. [A few of these papers have been abstracted separately.]

- (v) Morden, Manitoba (Shewfelt, A. L., and Witt, M. J.).

*Report of Fruit and Vegetable Products Laboratory, Morden, 1949-50*, pp. 7.

Freezing and canning preservation of fruits and vegetables; fruit and vegetable cooking tests; chemical analyses of fruits and vegetables.

- (vi) Kentville, N.S. (Eaves, C. A.).  
*Storage investigations, Kentville, 1949-50*, pp. 13.

Influence of orchard nutrition on keeping quality of (1) Cortland apples, and (2) McIntosh and Spy apples; gas storage investigations with McIntosh and Spy apples; investigations into the bruising of McIntosh apples; celery and tomato storage trials; experiments on control of apple scald.

- (vii) Division of Chemistry, C.E.F. (Harper, G. S., and Swann, I. H.).  
*Report of Fruit and Vegetable Products Research Committee, 1949-50*, pp. 8.

Optimum stage of harvesting peas and corn for freezing and canning.

2159. GULVAL EXPERIMENTAL STATION (ABBISS, H. W.).  
*Growers' notes and station record 1949-50*.  
N.A.A.S., South-western Province, Bristol, 1950, pp. 46.

*Broccoli*. A report on varietal selection work with Roscoff broccoli is given, with brief notes on the behaviour of December-January heading selections. Practical measures for the prevention of virus losses in broccoli are recommended. From observations made on the performance of Italian broccoli varieties, it appears that these are unsuitable for the Cornwall industry. *Potatoes*. A survey of early varieties. *Soil warming* appeared to be of little value for marrows and cucumbers on the light, warm Gulval soil, but in the case of French beans soil warming during the first 10 days after sowing resulted in more even germination and heavier yields. *Flowers*. A table of the relative flowering dates of a large number of daffodil, tulip and iris varieties. Notes on cultivation, corn raising and winter browning of anemones. Notes on cultivation and varieties of calendulas, wallflowers and gerberas based on records from observation plots. *Bulbs*. A detailed preliminary report is given of weed control trials in bulb beds with pre-emergence and post-blossom sprays. Trials to determine the effect of angle of planting on bulb yield and quality were carried out at Kirton, Silsoe and Gulval. Preliminary results indicated that there is no appreciable loss in yield from planting the bulbs at an angle of 45° or horizontal, but planting the bulbs upside down resulted in a 20% reduction with narcissi and a 9% reduction with tulips. *Storage temperature influence*. Reports are made on experiments to determine (1) the effects of various methods of handling and storage after cooling, and before planting narcissi, (2) whether it was safe to treat narcissus bulbs with warm water before cooling and the resting period required between treatment and cooling, (3) the effect of warm storage on gladiolus corms, (4) the effect of Dutch light coverage, with or without soil warming, on narcissi and tulips, and (5) the value of acclimatized stocks. *Miscellaneous use of bulb cold store*. The possibility of using the cold



store for cooling strawberry runners and rhubarb crowns and for holding cut flowers was investigated. The strawberry runners, which were cool-stored at 35° F. throughout January and then planted under cloches, flowered about 10 days earlier, had more flower buds and about 30% heavier yields than the uncooled runners. The crop matured about 5 days earlier.

2160. HAYTER, C. W. (S. RHODESIA, DEPARTMENT OF AGRICULTURE).

**Summary of Annual Report of the Horticulturist for the year ended 31st December, 1949.**

*Rhod. agric. J.*, 1950, 47: 312-15.

*Rhodes Inyanga Orchards*: With apples good results have been obtained from early summer pruning of strong leader growths. Among rootstocks Malling XVI has proved very prone to delayed foliation. *Sub-tropical Experiment Station, Umtali*: Brief mention is made of the cropping, in some cases with average yield figures, of peaches, plums, avocados, mangoes, litchis, oyster nuts (*Telfairia pedata*), pecans and tung. Among strawberries, plants of the "Salisbury" strain have yielded well, but Auchincruive Climax has proved unsatisfactory.

2161. HOPKINS, J. C. F. (S. RHODESIA, DEPARTMENT OF AGRICULTURE).

**Summary of Annual Report of the Chief Botanist and Plant Pathologist for the year ended 31st December, 1949.**

*Rhod. agric. J.*, 1950, 47: 356-63.

The following points of interest to horticulturists may be mentioned. *Tobacco*: Apart from general observations on diseases, including a new leaf spot in one locality caused by *Ascochyta* sp., the results of trials on the control of frog-eye spotting (*Cercospora nicotianae*) are summarized. Spotting was reduced both by pruning and field spraying, especially with bordeaux mixture. *Sugar cane*: Observations in the Triangle plantings suggest that smut (*Ustilago scitaminea*) is disseminated by both wind and water, particularly the latter. The incidence of the disease has declined since the eradication of the highly susceptible variety Co. 301. Among newly introduced varieties Co. 453 and 464 have developed the largest number of smut whips. *Apples*: Soil application of borax increased the yield of O'Hinemuri apples threefold, but did not reduce the proportion of cracked fruit. Response to zinc sprays was also obtained. *Vegetables*: Whiptail has been recorded for the first time in cauliflowers, the plants responding to treatment with ammonium molybdate at 1 lb. per acre.

2162. I.R.S.I.A.

*Comptes rendus de recherches. No. 4. Travaux du comité pour l'établissement de la carte des sols et de la végétation de la Belgique. (Research reports. 4. Work of the committee responsible for mapping the soils and vegetation of Belgium.)* [French and Dutch.]

L'Institut pour l'Encouragement de la Recherche Scientifique dans l'Industrie et l'Agriculture, Brussels, 1950, pp. 278, bibls., illus., 125 fr.

A report of the aims, methods and achievements of the committee set up in 1947 under the presidency of Prof. V. Van Straelen to map the soils and vegetation

of Belgium. The soils have been classified on the basis of their profiles and agricultural values. Individual papers in this report deal with the soil characters of various districts of Belgium, with brief or detailed reference to their agricultural value, to the value of test crops in soil mapping and to some aspects of vegetation mapping. The articles are in either French or Dutch, the Dutch ones having a French summary.

2163. JACOBS, K.

List of serials currently received in the library of the United States Department of Agriculture, November 1, 1949.

*Bibl. Bull. U.S. Dep. Agric.* 12, 1950, pp. 349.

14,329 journals and other publications are listed. It is noted in the preface that copies of articles from any of the publications can be obtained at the following prices: microfilms, a flat charge of 50 cents for any single article from a single volume of a periodical; photoprints, 50 cents for each 5 pages or fraction thereof from any single volume.

2164. JAMAICA (WRIGHT, J.).

**Department of Agriculture, Jamaica. Investigations 1948-1949.**

*Bull. Dep. Agric. Jamaica* 45, 1950, pp. 110, 2s.

This is a comprehensive report of all investigations in progress during 1948-9. *Potatoes*: Eight fertilizer trials showed no responses to N, but responses to P and K were obtained in some cases. *Bananas*: In breeding work for resistance to Panama and leaf spot diseases only Gros Michel and Highgate bananas are being used as female parents and the Pisang Lilan variety of *Musa acuminata* as a male parent. 37 seedling varieties are now under test. A spacing and manurial trial with Lacatan bananas showed that a 75% increase in yield of "count" bunches per acre was obtained by close spacing at 8 ft. triangular. Complete fertilizer and mulch gave small weight and bunch grade increases. *Citrus*: 3% Methoxone controlled epiphytes. Correct P and K manuring was found to be effective in reducing pre-harvest drop, but successful results have not yet been obtained from hormone spraying. Experiments are also in progress on coconuts, coffee and mangoes. C.W.S.H.

2165. "DE LANGE OSSEKAMPEN."

*Jaarverslag van de werkzaamheden verricht in het jaar 1947 op het Centrale Bemestingsproefveld voor de Fruiteelt "De Lange Ossekampen". (A.R. "Lange Ossekampen" central manurial trial ground, Wageningen, for 1947), pp. 83, illus. [undated, received 1950].*

The progress of the fruit manurial trials is reported. A more recent report of the experiments, giving a summary of the results obtained up to 1948, is published in *Meded. Dir. Tuinb.*, 1949, 12: 643-76 [*H.A.*, 20: 89].

2166. LAUSANNE.

Stations fédérales d'essais viticoles, arboricoles et de chimie agricole, à Lausanne et à Pully. Rapport d'activité 1949. (*Annual Report of the Lausanne Horticultural Research Station for 1949.*)

*Landw. Jb. Schweiz*, 1950, 64: 729-861, bibl. in text.

**Physiology:** Trials on the toxicity of sulphur sprays to apple showed that (1) lime-sulphur is slightly more injurious at 32° Bé than at 22° Bé; (2) the hyposulphite content does not account for differences in phytotoxicity between various sulphur sprays; (3) the addition of lead arsenate increases the toxicity of lime-sulphur more than that of wettable sulphur and (4) wettable sulphur is less toxic than lime-sulphur. Bordeaux mixtures made up with freshly slaked lime proved less phytotoxic to vine than when old lime was used. The control with 2,4-D of the following weeds is discussed: *Rumex* spp., *Cirsium arvense*, *Artemisia verlotorum*, *Urtica dioica* and *Oxalis stricta*. 2,4-D caused malformation in vine not only through aerial contact but also when it was absorbed by the roots of young vines. Deep-rooting older vines remained unaffected by soil applications. Growth substance treatment for fruit setting proved to be economic for glasshouse, but not outdoor, tomatoes. **Entomology:** Parathion gave excellent results against cochylis and eudemis, but its commercial use against vine pests has not been sanctioned in Switzerland. Other subjects discussed are: apple weevil control with parathion; the control of caterpillars injurious to buds and flowers; aphid control with parathion; codling moth control with DDT plus parathion to keep red spider down; and control and hosts of San José scale. **Microbiology:** It was found that oxyquinoline sulphate applied for the control of *Coniella diplodiella* on vine following hail damage to grapes (see *H.A.*, 20: 2512) is rendered partly inactive by reacting with copper residues from earlier anti-mildew sprays. Other diseases studied include peach mildew (*Sphaerotheca pannosa*), apple mildew (*Podosphaera leucotricha*) and shot-hole of cherry and plum (*Clasterosporium carpophilum*). The comparison of fungicides for the control of apple scab was continued. **Viticulture:** Results are tabulated of variety, rootstock and pruning trials. A support for vines, the Tréfix, used as a substitute for, or as an aid in, tying has been tested. The device facilitates cultivation and may be an advantage with certain varieties. **Arboriculture:** (1) Fruit storage: In trials with different pear and apple varieties cold storage at 4° C. and cellar storage without refrigeration were compared for fruit harvested on 3 dates. With the pear Duchesse d'Angoulême the fruit ripened better at the higher temperature, but the optimum date of picking could not be determined. Under Pully conditions the pear Passe Crassane was at its best when picked in the beginning of October and stored in a cellar. The data obtained with 3 apple varieties were inconclusive. In further trials 5 pear varieties were subjected to storage temperatures of 7, 4, 2 and 0° C. A pear-breeding programme was started in 1939 and some data on the fruiting of the hybrids are tabulated. Observations on trials with 5 EM. rootstocks worked with 6 apple varieties, among them the vigorous Gravenstein, are reported in some detail. In this experiment, which was laid down in 1938, EM. XII proved to be the most vigorous rootstock producing the highest yields and showing the lowest mortality. In spite of its excellent qualities, however, Swiss nurseries prefer EM. XVI, which is easier to propagate. Fruit and storage quality was found to be unaffected by the rootstock, with the exception of EM. IX, which tended to increase fruit size and colour and to affect storage quality

adversely. *The Soils and Fertilizer Department* records the effect of phosphate and potassium applications to vines upon yield and berry composition, while the *Substation in the Valais* presents some preliminary results obtained in variety trials with outdoor tomatoes.

#### 2167. THE MACAULAY INSTITUTE FOR SOIL RESEARCH.

*Annual Report Macaulay Institute for Soil Research for 1949-50*, Craigiebuckler, Aberdeen, 1950, pp. 48, illus.

After an Introduction the report describes the work of the Institute in: (1) Pedology, soil surveys in various parts of Scotland, and notes on laboratory investigations and collaborative work, the analytical section, soil geology and mineralogy, X-ray investigations, and physico-chemical investigations; (2) Spectrochemistry; (3) Soil organic matter; (4) Plant physiology (including radioactive studies); (5) Soil fertility, chemistry and field experimentation; (6) Collaborative work; (7) List of papers published during the year. In the section on plant physiology, work in progress includes studies on potassium-magnesium ratios in the presence of varying concentrations of nickel and boron to determine their effect on plants and nutrient uptake, field trials on the nutrition of raspberries, strawberries and gooseberries, and a re-examination of chemical methods of analysis of plant material.

#### 2168. MAINE.

*Agricultural Research in Maine, being 66th Annual Report of Progress, Year ending June 30th, 1950*, 1950, pp. 76, issued as *Bull. Me agric. Exp. Stat.* 483.

The following items are selected from numerous brief notes: *Apples*—breeding, intermediate stocks, fertilization with mulch and NPK, fungicides, pest control, storage, marketing. *Beans*—breeding for resistance to halo blight, chemical weed control. *Blueberries*—diseases, fertilizing, weed control, pruning, irrigation, pests, the use of an electric fence around experimental plots to control deer. *Broccoli*—freezing trials. *Cherries*—establishment of an experimental sour cherry orchard on mazzard and mahaleb cherry seedlings. *Corn*—sweet corn breeding and variety trials. *Melons*—variety trials. *Peas for processing*—fertilizer tests. *Potatoes*—control of aphids and leaf roll spread, mealy bugs, effect of applications and soil residues of DDT and toxaphene, the control of spindle tuber and other diseases, blight control, comparison of fungicides, deterioration and physical breakdown in transit, comparison of date of planting for 8 varieties, effect of spacing, weed control. A radioactive product called Alphonon did not increase potato yields. *Strawberries*—variety trials, flavour and vitamin C content. *Vegetables*—tomato variety trials, fruit set in cucumbers, weed control in onions.

#### 2169. MALAYA.

*Report of the Rubber Research Institute of Malaya for the period Jan. 1941-August 1945*. Kuala Lumpur, 1950, pp. 108.

This report covers a period of a year before the Japanese occupation of Malaya and a period of 3½ years under occupation. Many experimental results did not survive the occupation. *Propagation:* Hormone A increased the survival rate of budded stumps the lateral



roots of which were cut back to 0 or 1 in. in length.

**Tapping:** A large number of experiments were being undertaken but, as the majority had been in tapping for less than 3 years prior to the occupation and were then interrupted, they could not be continued. Full spiral tapping gave increases in yield. These increases were, however, at the expense of growth rate, though this growth retardation diminished after the first tapping year. Treating the tapping panel with palm oil has caused an increased rate of bark renewal. Scraping lightly 12 in. below the cut has also increased yields. **Manuring:** Experiments showed continued response to phosphates on new clearings, and to N and P on replanted areas. **Cover crops:** With young buddings growth was retarded slightly less by natural than by planted covers. There was no response to digging in. **Root diseases:** Stump poisoning did not eliminate sources of infection during replanting in the case of *Ganoderma pseudoferreum*; with *Fomes lignosus* it caused reduced infection in the first few years. Root disease incidence was lowered by ground covers.

C.W.S.H.

2170. MARAIS, J. S. (STELLENBOSCH-EISENBURG COLLEGE OF AGRICULTURE).

**Development of farming in the winter-rainfall area.**

*Fmg S. Afr.*, 1950, 25: 489-95.

This is the annual report of the Stellenbosch-Eisenburg College of Agriculture for 1949-50. **Viticulture and oenology:** The use of lupins for green manuring is presenting difficulties, as they cannot compete with certain weeds. Two large-scale manuring trials are in progress on sandy and red soil of granitic origin respectively. Results so far obtained indicate that nitrogen plays a very important part in grape yields. **Genetics:** Breeding work is reported on (a) tomatoes for resistance to krommek disease, (b) Cape spitzkool for the control of bolting and the development of certain characters, such as head type and earliness, and (c) carrots and beetroot for the control of bolting. **Entomology:** Work on pests included successful trials to control the grey-shelled snail (*Theba pisana*) and cutworms (*Euxoa segetis* and *E. subalba*) in potatoes by calcium arsenate baits.

2171. MINISTRY OF AGRICULTURE, LONDON (HORNE, F. R., AND OTHERS).

**Seeds. Report of the committee on qualitative control of seeds.**

Minist. Agric. Lond., 1950, pp. 31, H.M. Stationery Office, 1s.

A committee was appointed in 1949 "to consider what action is possible under the Seeds Act or under amendments to that Act, or otherwise, to introduce practical methods of qualitative control of seeds used in the United Kingdom, whether home-produced or imported". The committee confined its attention to the main classes of agricultural and horticultural seeds and did not deal with flower seeds, forest tree seeds or seed potatoes. Its recommendations are reported here, the following aspects being dealt with. (1) *A list of seeds to be subject to qualitative control.* It is considered that all seeds in common agricultural and horticultural use should be brought within the scope of the Seeds Regulations, and that all those seeds should now be tested in accordance with the full requirements

of the Act. (2) *Analytical standards in relation to seed control measures.* A revision of the prohibitive minima and declarable limits of percentage germination and purity is suggested, detailed recommendations being given in an appendix. (3) *Incidence of disease.* The possibility of controlling seed-borne diseases by legislative action is considered. (4) *Encouragement of the use of varieties or strains of proved value.* Prohibition of the sale of unsuitable varieties is also recommended. (5) *Authenticity and purity of strain and variety.* Causes of deterioration, methods of raising purity, variety nomenclature, certification of seeds and zoning of seed crops are among the subjects dealt with. (6) *Proposed technical committee.* Proposals are made for a technical committee and specialist sub-committees to deal with the many seed problems which have been discussed.

2172. MOSSOP, M. C. (S. RHODESIA, DEPARTMENT OF AGRICULTURE).

**Summary of Annual Report of the Chief Entomologist for the year ended 31st December, 1949.**

*Rhod. agric. J.*, 1950, 47: 331-8.

Notes are included on pests attacking tobacco, crucifers, ornamentals and several tropical and sub-tropical fruits during the year under review.

2173. NAUDE, T. J. (UNION OF S. AFRICA, DIVISION OF ENTOMOLOGY).

**Entomological problems in the Union.**

*Fmg S. Afr.*, 1950, 25: 478-85.

This annual report of the Division of Entomology, Department of Agriculture, S. Africa, for 1949-50 contains the following items of horticultural interest. **Biological control of prickly pear:** Experiments on the biological control of prickly pear and observations on a parasite of jointed cactus are noted. **Insecticides:** Laboratory tests of insecticides embraced 4 systemic chemicals and some of the latest compounds. **Pests of citrus and sub-tropical fruits:** Spraying trials against false codling moth (*Argyroproct leucotreta*) were inconclusive because of low incidence of the pest. At Nelspruit, orchard sanitation was found to reduce false codling moth damage and loss by all causes combined by about 50%. At Rustenburg, parathion at 5 lb. per 100 gal. proved deadly to adults of the fruit fly, *Pterandrus rosa*, for at least a month after treatment. Official trials at various places have so far not confirmed the view that parathion kills red scale (*Aonidiella aurantii*) as effectively as HCN fumigation, though it proved satisfactory against the circular purple scale (*Chrysomphalus ficus*) and mealybug (*Pseudococcus citri*), and was only very slightly inferior to fumigation against the mussel scale (*Lepidosaphes pinnaeformis*). DDT gave good results against litchi moth (*Argyroproct peltastica*). In spraying trials on deciduous fruit DDT emulsion failed to control fruit fly (*Pterandrus rosa*) on peaches. **Pests of stored tobacco:** Stack fumigation of cigarette tobacco with methyl bromide under plastic covers gave 100% kill of the cigarette beetle (*Lasioderma serricorne*). **Pests of forest trees:** Notes are included on the eucalyptus snout-beetle (*Gonipterus sentellatus*) and the wattle bagworm (*Acanthopsyche junodi*). **Vegetable pests:** Brief reports are given on cucurbit fly (*Dacus vertebratus* and *D. ciliatus*), onion thrips (*Thrips tabaci*) and cutworm (*Euxoa segetis*).

2174. NEL, R. I. (WESTERN PROVINCE FRUIT RESEARCH STATION).  
**Developments in the fruit industry.**  
*Fmg S. Afr.*, 1950, 25: 496-501.

These are some of the subjects summarized in the report of the Western Province Fruit Research Station, Department of Agriculture, S. Africa, for 1949-50. *Agricultural meteorology*: Experiments were carried out with a view to obtaining quantitative data on the chilling requirements of peach trees. The aim is to develop a method by which susceptibility to delayed foliation can be determined in any particular season, irrespective of the winter temperature. *Breeding*: Peach: the work aims at the production of early white-fleshed dessert varieties resistant to delayed foliation. Pear: many crosses have been made to obtain a Bon Chrétien type pear of good keeping quality. Guava: 2,000 hybrids are undergoing further tests for canning quality. Olive: the modified bark-grafting method of top-working wild olives has again given good results and is strongly recommended. Berries: the results obtained in the Young- and Boysenberry experiments are to be published in a separate bulletin; the so-called Du Toit strawberry selection appears to be highly resistant to virus diseases while producing fruit of excellent quality. *Table grapes*: Research is in progress on the development of a standard punnet, made of paper pulp, of approximately  $1\frac{1}{2} \times 6 \times 4$  in. For the fourth successive year late topping (September) gave good results with Waltham Cross, the effect on the appearance of the grapes in general and on the incidence of undesirable seedless berries being very striking. Twelve years of manurial trials have shown that balanced fertilizer applications and adequate water supply are the principal factors determining crop size. On unfertilized plots an irrigation of 8 in. gave a crop increase of  $\pm 66\%$ , while a complete fertilizer with irrigation effected an increase of 220%. In storage trials with new apparatus (illustrated) it was possible to maintain the  $\text{SO}_2$  concentration in the gas chamber at 20 p.p.m. and to keep grapes in good condition for 6 months. *Orchard and vineyard diseases*: The testing and breeding of varieties resistant to bacterial blight (*Erwinia vitivora*) continues. Other diseases discussed include gummosis and canker of stone fruit, apricot freckle, which has assumed alarming proportions, and infectious chlorosis of plums, for the elimination of which a parent tree certification scheme has been introduced. *Storage*: Pear: a temperature of 31° F. for a period of 9 days or longer was shown to effect complete mortality of the larvae of both *Ceratitis capitata* and *Pterandrus rosa*. Apricot: in tests covering several varieties it was found that 31° F. is the optimum temperature for Royal. Delay in harvesting caused the appearance of jelly-like spots. Peach: about 100 new peach varieties were tested, and it was found that some otherwise promising varieties did not stand up to cold storage; acetylene treatment and holding at air temperature before cooling gave promising results. Plum: of the varieties tested Gaviota was the most satisfactory; Kelsey and Santa Rosa were also found to ripen well if first subjected to a temperature of 45° F., and this procedure may make it possible to by-pass the pre-cooling chambers. Orange: the critical temperature for the development of orange colour would appear to be

between 50° F. and 53° F., and early Navel oranges should therefore be exported at a temperature above 53° F.; at temperatures below 50° F. green oranges merely assume a yellow colour; experiments with diphenyl wrappers at temperatures ranging from 31° F. to 45° F. indicate that diphenyl is ineffective at low temperatures. Persimmon: the optimum temperature was found to be 31° F. *Fruit juices*: Determinations showed that the vitamin C content of the fruit of Mexican hawthorn is 140 mg. per 100 g. and the carotene content 7,000 international units vitamin A per 100 g.

2175. NORTHERN NUT GROWERS ASSOCIATION  
 — INC.  
*Proceedings of the 39th Annual Convention of the Northern Nut Growers' Association Inc., 1948, Norris, Tenn., pp. 224 [received 1951].*

Among the many matters of interest discussed were nut cultivation in various parts of U.S., development and filling of nuts, chestnut breeding, processing and marketing, and diseases affecting nut trees. Separate abstracts of some of the papers are given in the appropriate sections.

2176. NYASALAND PROTECTORATE.  
*Report of the Department of Agriculture, Nyasaland, for 1948, Pt. II—Experimental work,\* pp. 15 [received 1951].*

*Tung*: The selection of *Aleurites montana* mother trees and their vegetative propagation on seedling rootstocks continued, though it is becoming increasingly clear that mother tree records can only be a preliminary guide for selection and that the final choice must always be based on the performance of the budded progeny. The general superiority of buddings, particularly those on *A. montana*, over seedlings was further demonstrated. In clonal trials the early cropping B-type clones have so far given the highest yields, but owing to their lack of vigour it seems probable that many of them will reach peak production early and will later be outyielded by the more vigorous and slower maturing A-types. Experiments have shown that of 4 crops used for intercropping, soya beans have been the most effective, the benefit persisting up to 4 years after intercropping ceased. A significant response in both growth and yield was obtained from the use of N fertilizer. *Tea*: No significant differences in yield were recorded from various treatments applied to old tea after down-pruning, or from different tipping levels and pruning treatments applied to China Jat or from different methods of treating young tea. Earlier results indicating that closer spacings give higher yields have been confirmed. An experiment on different methods of pruning on Indian Jat has shown that up to about 10 years of age the highest yield was obtained from cut-across treatments, and extended pruning cycles gave greater yields than an annual clean prune. During the third period, however, when the tea was 11 to 13 years old, clean-pruned treatments resulted in greater yields. The time of application of fertilizer has little effect on the yield of leaf. Trials on vegetative propagation by means of leaf-cuttings were continued.

\* For Part I, see *H.A.*, 20: 3429.



## 2177. PENNSYLVANIA.

*Science for the Farmer*, being *63rd Annual Report of the Pennsylvania Agricultural Experiment Station for year ending 30th June 1950*, pp. 60, issued as *Bull. Pa agric. Exp. Stat.* 529.

The following items are selected from this report: *Foods*. The flavour of canned peaches from trees sprayed with various insecticides was evaluated. *Orcharding*. Rejuvenation of old apple trees, while successful, proved to be uneconomical unless their fruit was of unusual value. Incorrect pruning or lack of training rendered heavily laden young apple trees liable to breakage. A considerable yield increase was noted in a cherry orchard under ladino clover sod as compared with cultivated plots. Entomological investigations reported include: improved control of terrapin scale, European fruit lecanium and European red mites through dormant and delayed dormant sprays with "superior" oils, cherry fruit fly control with lead arsenate, a cherry spray schedule found successful in south central Pennsylvania, the use of parathion against plum curculio on prunes, and a DDT and parathion spray schedule for the control of grape berry moth. *Tobacco*. Two wildfire-resistant tobacco lines compared favourably with the Swarr-Hibshman, an accepted variety. Heavy  $K_2O$  applications of 500 to 1,000 lb. per acre improved quality in tobacco, and urea sprays appeared promising as a source of N. *Vegetable and flower growing*. Progress in breeding hybrid tomatoes, hybrid eggplants, sweet corn and lettuce is reported. With peas it was shown that under uniform conditions the number of "heat units" between sowing and harvesting is relatively constant for each variety. Parathion aerosols still appeared to provide the best means of controlling red spider mites in greenhouses.

## 2178. PREECE, I. A.

*Report on the Fermentation Industries for 1949*.

Reprinted from *Reps. Progr. appl. Chem.*, Society of Chemical Industry, 1950, pp. 26, bibl. 279.

In a section dealing with hops, recently published work on cultural problems in various countries is briefly reviewed.

## 2179. QUEENSLAND.

*Annual Report of the Department of Agriculture and Stock, Queensland, for the year 1949-50*, Brisbane, 1950, pp. 99.

Sections of horticultural interest include the following: *Horticulture branch*: Sodium pentachlorophenate proved to be an effective herbicide in pineapple plantings. Studies on the physiology of flower induction and pineapple nutrition were continued;  $\alpha$ -naphthalene-acetic acid has now largely replaced acetylene in the commercial control of flowering. Banana plantings are still on the decrease. In trials at the Maroochy Horticultural Experiment Station heavy dressings of lime were associated with star cracks on the skin of the papaw fruit. Of the apple rootstocks released by C.S.I.R.O. to growers, Merton 778, 793 and 789 are of particular interest. Frost protection trials in a citrus nursery have shown that oil burners are not economical, but good results were obtained by a light sprinkler

irrigation when temperatures fell below 28° F. Irrigation of the Fuerte avocado when the crop set in spring increased yields considerably. An increased interest is shown in custard apples. Diseases caused heavy losses in tomato production, though the newly released certified varieties, Q1, 2, 3 and 4, performed well. Brief reports are given of the work of the Experiment Stations at Maroochy, Redlands and Kamerunga. Other problems investigated include storage of citrus and onions, wastage in citrus, bananas and pineapples, maturity investigations on grapes, citrus and pineapples, ripening of bananas and papaws, processing of bananas and onions, and quick freezing of tropical fruits. *Bureau of Sugar Experiment Stations*: Notes are given on yields of sugar cane, varietal trials, the work of the experiment stations, soil investigations, herbicides, entomology, pathology and cane breeding. *Science branch*: Work is reported on the diseases and pests of deciduous fruits, citrus, tropical fruits, vegetables, potatoes and tobacco. *Tobacco*: Varietal, fertilizer, crop rotation and irrigation trials were carried out on 3 tobacco experiment farms.

## 2180. RIJKSTUINBOUWVOORLICHTINGSDIENST, THE HAGUE.

*Tuinbouwgids 1950 [and] Tuinbouwgids 1951. (Horticultural guides to the Netherlands for 1950 and 1951.)*

The Hague, Holland, 9 × 6½ in., pp. 748 and 844 respectively, illus., fl. 4 each.

The new format of *Tuinbouwgids* is a welcome improvement, as the publication has recently outgrown the limitations of a handbook. The larger print used for the articles makes them more readable, and the larger pages allow the tables to be set out to better advantage. As usual, these 2 volumes contain details of the advisory and research services of Holland, data and statistics on weather, land utilization, production, imports and exports, prices and horticultural legislation, and up-to-date information on all aspects of production and pest control, as well as a few short articles by specialists.

## 2181. SOUTH AFRICAN SUGAR JOURNAL (THE EDITOR).

*The South African sugar year book 1948-49*, South African Sugar Journal, Durban, [1950 ?], 8½ × 5½ in., pp. 258, 5s.

The yearbook, now in its nineteenth year of publication, contains information on a wide variety of subjects relating to the growing of sugar cane and the manufacture of sugar in Natal. Its main sections are: (1) Annual reports and addresses, including opening addresses to the South African Sugar Technologists' Association, and weather and crop statistics; (2) organizational and reference section; (3) research institutions and organizations, including a summary of work in progress at the Experiment Station, Mount Edgecombe, and a list of all the cane varieties growing there; (4) sugar milling and refining enterprises; (5) a survey of the world sugar market; (6) articles of general interest; (7) statistical section, including tabulated details of sugar production in South Africa from 1891 to 1949, the tonnage of cane with the percentages planted to the principal varieties from 1942 to 1949 (in 1948/49 Co. 281 and Co. 301 made up



93% of the total), data on acreages and yields, and details of consumption and cane and sugar prices.

# 2182. TANGANYIKA.

*Annual Report of the Tanganyika Department of Agriculture for 1948, 1950*, pp. 173, 7s.

Section I of this report includes notes on a number of main and minor crops, root crops and legumes with particular reference to yields for the year. Section II deals with the work of the department and the activities in the various provinces. The annual report of the *Coffee Research and Experiment Station* is published separately. An interim report mentions that experiments to improve the technique of rooting cuttings was resumed. Type and position of basal cut, preparation of material, rooting media, and control of light, temperature, and moisture were among the problems receiving most attention. In the experiment comparing single and multiple stem systems, the former this year gave the higher yield, though over a period of 11 years the multiple stem system maintains its superiority, yielding 57% more crop. Mulch, compost, and sulphate of ammonia have this year generally decreased yield when applied in combination, though increases at varying levels are shown for each when applied in the absence of the other two. Seedlings have this year outyielded clones, and the latter now maintain only a slight superiority over a 4-year period. Some of the later plantings in the clonal selection trials came into bearing for the first time: yields were generally satisfactory. A full annual report of the *Sisal Experiment Station* is published separately. An abridged report deals with a number of projects, and field trials are mentioned. The second-cycle sisal under the clean weeding treatments in the cultivation trial poled out during 1948. Results showed that the total number of leaves grown per plant declined from 220 to 200 per plant in the second cycle; the number of leaves cut per plant likewise fell from 190 to 160. A spacing trial showed a high positive correlation between total fibre yields and plant density during the first cycle. An external fertilizer trial on land where the previous crop suffered badly from "banding disease" showed that disease symptoms may be greatly reduced by applications of potash. Sections III and IV deal with finance and legislation, while Section V consists of reports of the technical and specialist officers for the year.

# 2183. TEXAS.

*Agricultural Research in Texas, 1947-49*, being [Triennial Rep.] *Texas agric. Exp. Stat.* [1950], pp. 201.

Among the many aspects of agricultural research reported, the following are of interest to horticulturists: *Entomology*: control of onion thrips and vegetable aphids. *Horticulture*: breeding of peaches, berries, figs, strawberries, grapes and dates, certification of citrus and peach budwood; rootstocks for citrus and Bruce plum; orchard soil management; pecan breeding and studies on harvesting and handling equipment; breeding of vegetables and sweet potatoes; fertilizer experiments; fruit and vegetable processing. *Plant pathology*: potato late blight control; prevention of virus diseases of citrus trees, especially of psorosis or scaly bark; breeding for root-rot nematode resistance

in tomatoes and downy-mildew resistance in cantaloupes. *Brush control*, mechanical and chemical.

# 2184. TYSSER, H. F. (Editor).

*The fruit annual 1949/50 and 1950/51*. British-Continental Trade Press Ltd., 222 Strand, London, 6×9½ in., pp. 403 and 416 respectively, 20s. each.

These annuals, with the sub-title "Yearbook and directory of the world's fruit trade", contain as usual a wealth of information in the following articles: Survey of the world's fruit trade; World citrus production and distribution; Fruit supply calendar (tabulated by variety of fruit according to countries, for each month of the year); Fruit trade organizations; Journals of interest to the trade; Air transport of fruit; Sea transport of fruit; Dried fruit trade survey; and Directory of the world fruit trade. In addition, the 1949/50 annual contains chapters on the quick-frozen fruit trade, modern canning methods, health properties of fruit, U.K. import regulations and maximum prices, the fruiterers' display, prevention and control of fruit pests after harvest, handling equipment for fruit warehouses, and dried pineapples. Other subjects covered in the 1950/51 annual include world crops of deciduous fruits, world banana exports, market fruits and their varieties (descriptions of the main fruits, both temperate and tropical, and of many varieties of each species), progress in quick-freezing, and electronics in the fruit industry.

# 2185. UNION OF SOUTH AFRICA.

*Annual Report of the Department of Agriculture for the year ended 31 August, 1950*. *Fmg S. Afr.*, 1950, 25: 379-504.

The report of the Secretary for Agriculture (pp. 379-414) gives an account of the Department's activities and reviews the main agricultural products of the Union. The rest of the publication consists of Divisional reports, which are abstracted separately, as far as they contain information of horticultural interest. [See above Nos. 2142, 2152, 2153, 2170, 2173, 2174.]

# 2186. WESTERN CANADIAN SOCIETY OF HORTICULTURE.

*Report of Proceedings of the Western Canadian Society of Horticulture, Sixth Annual Meeting*, Winnipeg, 1950, pp. 86.

The field covered includes: recommended varieties of fruits, vegetables and ornamental plants; plant breeding and selection; reports on research and publicity; nursery and seed trade; zoning of horticultural plants; rodents; and chlorosis. [Several papers are abstracted separately in this number.]

# 2187. WOODMAN, R. M.

*A survey of the Horticultural Research Station 1922-1949*. *Mem. Sch. Agric. Camb.* 22, Rev. Ser. 5, 1951, pp. 24, 2s. 6d.

This is a short history of the Station, with a list of its publications and their authors, and abstracts of papers published in 1949 and 1950.

# 2188. ZANZIBAR.

*Annual Report of the Zanzibar Department of Agriculture, 1949, 1950*, pp. 64, 2s.

Investigational work mentioned in this report includes the following: *Cloves*: Attempts to transmit sudden



death disease by mechanical inoculation has not been successful. The scale insect *Saissetia* is still being studied and no more likely vector has been discovered. It has not been possible to graft other *Eugenia* species to the clove. It has been shown that reduced assimilation and transpiration, which are a feature of sudden death disease, are due to some effect on the stomatal mechanism and not to a failure of water supply from the roots. In a manurial trial, sulphate of ammonia and phosphates had a depressing effect on yield, but it is thought possible that this was due to a stimulation of cover crop and weed growth which in turn competed with the cloves. *Coffee*: Blocks of excelsa and liberica coffee have shown different relative yields in different years. While excelsa yielded best in 1948, in 1949 liberica gave much the higher yield, due probably to low rainfall conditions having a more detrimental effect on the excelsa. *Tapioca*: In a standard fertilizer trial being carried out on many crops and soil types throughout E. Africa, no responses to NPK were obtained with tapioca. *Cacao*: Propagation trials with Hortomone A have begun. A provisional classification of soils according to their suitability for cacao has been made.

C.W.S.H.

### New periodicals.

2189. AMERICAN CHEMICAL SOCIETY.  
*Advances in Chemistry Series 1, Agricultural Control Chemicals.*  
American Chemical Society, Washington, D.C., 1950, 9½×6 in., pp. 273, bibls., \$2.50.

This first number of a new series comprises 48 collected papers from the symposium on Economic Poisons presented before the Division of Agricultural and Food Chemistry in March and September, 1949. The papers are largely concerned with the newer insecticides, and their presence as residues on fruit and other foods. Abstracts of a number of papers are given earlier in the appropriate sections.

2190. EDWARDS, R. L. (Editor).  
*Mushroom Science—1. The proceedings of the first international conference on scientific aspects of mushroom growing*, Peterborough, 1950, 9×5½ in., pp. 111, illus., 7s. 6d.

These "Proceedings" comprise 33 articles dealing with various aspects of mushroom growing. New contributions are given in full, others are summarized. Some of these are abstracted in the appropriate section.

2191. NORMAN, A. G. (Editor).  
*Advances in Agronomy, Volume 1.*  
Academic Press Inc., New York, 1949, 9×6 in., pp. xii+439, bibls., illus., \$7.50.

Another review journal, certainly. Yet with the rapid expansion of agricultural science and the increasing specialization of the scientist there is a growing need for journals publishing comprehensive, up-to-date and critical review articles on progress in the various fields of agronomic research and practice. *Advances in Agronomy* appears to fulfil this function admirably. The central theme is soil-crop relationships, but the editors' interpretation of agronomy is wide and it is intended from time to time to include articles dealing

with horticulture and forestry. Among the 10 articles contained in this volume are ones on "Plant growth on saline and alkali soils", "New fertilizers and fertilizer practices", "Soil micro-organisms and plant roots", "Weed control", "Boron in soils and crops", and "Potato production". The articles are written by specialists, and in this volume it is primarily North American work that is reviewed. In later volumes, however, it is intended to publish articles by workers in other countries. The extensive bibliographies make the papers of real value for reference purposes, although it is regrettable that they do not contain titles. The volume is provided with a subject index and an index of authors cited in the bibliographies. P.R.-D.

2192. NUTTONSON, M. Y.  
*International agroclimatic series.*  
Amer. Inst. Crop Ecol., Washington, D.C., 1947 to 1950, pp. 11 to 64+tables, bibls., maps.

The object of this series of studies is to define the distinct agro-climatic conditions prevailing in different parts of the various countries of the world (one country being dealt with in each study), and to compare them with the various agro-climatic regions of North America, in order to ascertain climatic analogues. Climatic analogues are areas that are sufficiently alike with respect to some of the major weather characteristics affecting crop production to offer a fair chance for the success of plant material transplanted from one area to its climatic counterpart. These studies may make possible the immediate utilization of introduced plant material with considerable hope of success, without having to expend time and effort on field variety trials. The countries so far studied include the Ukraine, Poland, Czechoslovakia, Yugoslavia, Greece, Albania, China, Germany, Japan, Finland, Sweden, Norway and Siberia. The findings are well summarized in maps and tables and each study has a useful bibliography.

### Noted.

2193.  
a BUTTRESS, F. A.  
*Agricultural periodicals of the British Isles, 1681-1900, and their location.*  
Univ. Cambridge Sch. Agric., 1950, pp. 16, 2s.  
b CANTERBURY AGRICULTURAL COLLEGE.  
*Annual Review Canterbury Agricultural College for year ending 30th June, 1950*, Lincoln, New Zealand, 1950, pp. 68.  
c HARVARD UNIVERSITY (BOSTON).  
*Botanical activities at Harvard.*  
Reprinted from *Rep. President Harvard Coll. and Repts. Depts.*, 1948-49, pp. 36.  
d KUNGL. LANTBRUKSAKADEMIEN.  
Verksamheten vid Kungl. Lantbruksakademien trädgårdsskola 1949. (*Annual Report of the horticultural college of the Royal Swedish Academy of Agriculture.*)  
*J. roy. Swedish Acad. Agric.*, 1950, 89: 57-61.

NOTES ON BOOKS AND REPORTS

e NATIONAL RESEARCH COUNCIL, CANADA.  
The National Research Council Review,  
1950.  
N.R.C. No. 2254, 1950, pp. 278, 75 cents.

f U.S. DEPARTMENT OF AGRICULTURE.  
*Agricultural Statistics, 1947.*  
U.S. Govt. Printing Office, Washington,  
D.C., 1948, pp. 688 [received 1951].